

Chapter II - METHODS AND FREQUENCIES OF SAMPLING

SECTION 201 GENERAL

It shall be the responsibility of the District Materials Engineer, as representative of the District Administrator, to maintain general supervision over the taking of samples in the field for submission to the Laboratory. The District Materials Engineer is also the field representative of the Materials Division and represents the State Materials Engineer in matters pertaining to sampling. Sampling of materials in the field (from project, plants, or distributors) shall be done only by properly instructed and authorized personnel, as outlined in Sec. 106.02.

When feasible, manufactured material will be sampled as close to the source of manufacture as possible. When beyond State boundaries, this will usually be done by a commercial laboratory representative contacted through the Central Office Materials Section. Materials composed of several different tested items, will be tested after the materials are combined and before final incorporation into the job.

When Construction Inspectors are authorized to take samples, the responsibility of the District Administrators, Resident Engineers, and District Materials Engineers shall not be relieved.

For a test to be valid the sample must be as nearly representative of the material as possible. Material is to be sampled by an employee or an official representative of the Department of Transportation when such samples are to be tested as a basis for acceptance or rejection of the supply.

The sampler must be aware that some materials segregate and, therefore, the sample unless properly taken could give a false impression of the whole. Samples are taken randomly in a preconceived method to reduce bias, either intentional or unintentional on the part of the sampler.

There are a number of ways the randomness may be accomplished. Such details are contained in other instructions issued by the Materials Division, in the Virginia Test Methods Manual or Study Guides for the appropriate material.

The sample for materials that tend to segregate easily, such as aggregates, should be of sufficient size that the laboratory may reduce the material to testing size by one of the methods outlined in AASHTO T248.

In other sections, the sample size is specified as the cube root method, which is simply the cube root of the number of units considered in the entire lot.

Samples for new products or innovations may be submitted by the Producer or Manufacturer of the product, but the materials represented by such samples must be resampled and tested by an authorized employee or representative of the Department, and approved, before the material may be accepted in highway construction or maintenance.

It is important to note that the frequencies for sampling outlined herein are the minimums required for materials acceptance. The Department has the prerogative of taking more samples, should the need be so indicated by questionable or suspect material or test results.

Quite often it is important to increase the frequency of sampling when a production plant initially begins and to decrease as the product approaches an even characteristic. Increased frequency may

also be warranted if the source is a new one to the Department, at least, until such time as the quality control of the product is proven.

It should also be noted that, unless shown otherwise, the frequencies and locations for sampling apply primarily to source sampling. If it is necessary to perform sampling of material at the project site, this will usually be at a lesser frequency than source sampling. See Sec 205 for the normal sampling location.

SECTION 202 DEFINITION OF SAMPLES

In order to properly identify the various types of samples, and in order that the Materials Division may properly distribute the test results to the field, it will be necessary that samples be designated as outlined in the following sections.

Sec. 202.01 Investigation Samples

Investigation samples are those taken by any properly trained representative of the Materials Division, and used for approval of new products, approval of new sources of supply, or for information of the Contractor. Any pertinent information regarding the sample should be recorded on the proper form accompanying the sample to the Laboratory, in order that the material under investigation can be readily tested and identified for future use.

Sec. 202.02 General Samples

General samples are those usually representing large quantities of materials in stock at a Producer's location. These samples ordinarily will be submitted for test by representatives of the Department. After the material is approved for use by the Materials Division, it will later be released from stock to various specific projects in specified amounts. The sum total of all the individual amounts released to different projects should never exceed the total amount originally reported in stock as being tested and approved on any one general report.

Sec. 202.03 Acceptance Samples

Acceptance samples are those submitted for test during the normal course of construction or maintenance and are used for purposes of routine acceptance or nonacceptance. These samples constitute the principle means of determining, prior to or at the time of the construction or maintenance operations, whether the materials and workmanship are satisfactory or whether corrective action should be taken before the work proceeds. Under ordinary conditions, this will be the type sample most commonly used.

Only properly instructed and trained Department representatives may take this sample. Acceptance samples will normally represent material being used on specific projects, and should be identified with the correct project and section numbers when submitted to the Laboratory for testing. Acceptance samples should be taken in such quantities and at such times as specified in the various sections of this Manual, in specifications, in special provisions, or in letters of instruction from the Engineer, in order to sufficiently maintain proper and normal sampling and acceptance.

These samples and tests are made to determine on a regular basis whether the quality of the materials being used or proposed for use in the construction and maintenance and the quality of the work being produced are in reasonably close conformity with the plans and specifications.

Acceptance samples are described as being of one of the following 5 types:

- (1) Samples of material taken and tested at the site by project personnel. Project personnel will make routine test reports and distribution of these reports, as outlined in other sections of the Manual or instructional memoranda. An example of this would be a soil density test, which would be reported on Form TL-125, etc.
- (2) Samples of materials on work taken at the site by project or laboratory personnel and tested at the District or Central Laboratory, with test results obtained for each of the required tests being reported to the project personnel, as outlined in other sections of the Manual or instructional memoranda. This report may be in the form of numerical test results or in the form of an inspection and release report. An example of this sample would be a concrete cylinder, which would be reported on Form TL-26 (TL-26A and B for computer input and output respectively).
- (3) Samples of materials taken by District or Central Office Laboratory personnel at the production or processing plant, shipping point, or other source of origin remote from the project and tested at the District or Central Office Laboratory, with test results obtained for each of the required tests being reported to the project personnel, as outlined in other sections of the Manual or instructional memoranda. This report either may be in the form of numerical test results or in the form of an inspection and release report. An example of this type would be epoxy, which would be reported on Form TL-109, with the numerical test results kept on file in the laboratory on Form TL-30.
- (4) Samples of Asphalt Mixtures and Central-Mixed, Dense Graded Aggregates will be taken by the Contractor under the Quality Assurance Program and the Department will perform independent assurance sampling and Quality Assurance testing checks to verify the accuracy of the Contractor's testing program. The Contractor will furnish the test results to the Department on forms furnished by the Department. The routing of the reports will be handled as outlined in other sections of this Manual.
- (5) Samples of manufactured materials taken and tested by the Manufacturer or Supplier and accepted by the Department on Mill Analysis, test report, or certification. An example of this type would be hydraulic cement or guardrail.

For frequency of acceptance sampling and testing, see Sec. 205 and other sections covering each individual material.

In the event certain acceptance samples fail, the material represented by the failing sample(s) will be subject to a price adjustment or removal from the road. This applies primarily to such materials as asphalt mixtures and central-mixed aggregate base and subbase materials.

Sec. 202.04 Independent Assurance Samples

Independent Assurance Samples are samples tested to verify the quality of testing that is used for acceptance of materials. The IAS program covers both project related testing, such as depth, density, slump, air, compressive strength, and plant produced materials on quality control/quality assurance programs.

See Section 206 for details on testing frequencies for project site testing. See Section 311.05 and 502.04 for details on testing frequencies for plant produced materials.

See Sec. 202.06 for details of certifying I.A. sampling and testing to FHWA at the completion of each project for project related testing.

Sec. 202.05 New Products

New Products or methods are constantly being brought to the attention of the Department Engineers. These are products which are not covered by current specifications.

When this occurs, the vendor should complete a "New Products" questionnaire available from any Materials office. The instructions thereon are evident.

The New Products Committee will then consider the product and take appropriate action. This action may be in the form of complete acceptance, complete rejection, request for further information, referral for advice to another Division, or a decision to place a trial field installation.

Once a new product has been accepted by the New Products Committee for field evaluation, the District Representative is to assist the Committee by selecting sites for field evaluation; by arranging for installation using Residency forces or as an addition to a current contract; by observing the installation; by making periodic on-site inspections, and reporting observations; and by making recommendations concerning further use.

(a) Preparation

- (1) When called upon to assist in coordinating and expediting the process of getting a new product installed and evaluated, the District Representative should review all pertinent literature available, brief the Resident Engineer and establish contact with the Manufacturer's representative requesting his/her presence at the time the product is placed.
- (2) Determine exactly what the product is supposed to do and then establish the kinds of tests and observations which will verify or disprove the Manufacturer's claims concerning the product. Seek assistance of the Materials Division and/or Research Council in designing the evaluation program.
- (3) Decide upon the factors which will affect performance, such as temperature and moisture.

(b) Design of Field Installation

- (1) Decide upon the more important and achievable goals for the field installation. In other words, what are the performance characteristics we hope to evaluate?
- (2) Decide upon the number and size of the "test sections" and "control sections". The test section is the section in which the product is placed, and control section is the section without the product and to which performance is to be compared. It is important to place test sections and control sections under as similar conditions as possible where the only significant variable is the product itself.
- (3) Decide upon the test site. Place the test section and control section as close together as possible, but separate the two sufficiently to avoid contamination. Consider the influence of such factors as geometrics, soil conditions, drainage, shaded areas, use of de-icing chemicals, traffic volume and type, etc.
- (4) Decide upon the sampling, testing, and observation programs that will be followed, especially frequency and duration. The use of statistical analysis is encouraged wherein an appropriate number of samples are obtained in a randomized sampling plan.

(c) Installation

- (1) Where practicable, schedule installation for the conditions recommended by the Manufacturer.

- (2) Arrange for the Manufacturer's representative to be present during installation.
- (3) Follow Manufacturer's recommendations for installation as closely as possible. Document the procedures followed and especially any deviation from the Manufacturer's published recommendations.
- (4) Record field conditions, time frames, delays, construction practices and equipment used, worker's skills, and any failure noted during installation.
- (5) Take photographs of the critical phases of the installation.

(d) Reporting

- (1) Prepare a report of observations and tests conducted at the time of installation and at the time of each subsequent visit made to monitor performance.
- (2) Use the Field Performance Evaluation forms shown in Sec. 800, where applicable, and submit the information called for thereon where appropriate. Attach copies of test reports and photographs taken.
- (3) Forward reports to the Chairman of the New Products Committee for distribution to the Committee. Be sure to include appropriate recommendations regarding the products.

Sec. 202.06 Materials Notebook Submittal

At the completion of each project, the District Material Engineer will include a statement at the end of the materials notebook to be submitted to the District Administrator certifying that the required number of acceptance and I A. samples have been taken on the project and that the acceptance sample test results indicate that all of the materials used on the project were in reasonably close conformity with pertinent approved plans and specification requirements. The statement should further certify that the test results of acceptance samples compare favorably with those of I. A. samples and tests. Any exceptions to the above statements should be noted. Certification to the F.H.W.A. of materials acceptance will be made by the District Administrator on Form TL-131, as outlined in Sec. 800. Materials notebooks will be audited by the Central Office at random in the District Materials Office.

Sec. 202.07 Materials Project Records Retention

With concurrence of the District Contract Administrator the District Materials Engineer's project records shall be kept on file for 5 years after close of project and then destroyed with the exception of Soil survey reports, supplemental soil survey reports (pavement design revisions, special slope reports, special foundation reports, etc.), pipe foundation reports and minor structure foundation reports. These records shall be submitted to the Administrative Services Division's Main File Room for microfilming. Three copies of the microfilm will be made, one copy to be forwarded to the Central Office Materials Division, and one copy to be retained by Administrative Services Division's Main File Room, one copy to be returned to the District Materials Section. The project records may be stored for the five years retention period as on site paper documents, off site paper documents, or as microfilm or electronic format documents as desired by each District Materials Engineer.

SECTION 203 SUBMISSION OF SAMPLES

The submission of samples to the Materials Division for tests shall be in accordance with the instructions given for each type of material. If there is any doubt about the proper procedure to follow, the District Materials Engineer or the Materials Division should be contacted for instructions. Any material that is toxic or flammable should be plainly marked, so that in cases of accident, doubt

will not exist with regard to handling. The table shown in Sec. 205 briefly summarizes the requirement for the proper size of sample, the container, and necessary packing when submitting samples to the Materials Division. More detailed instructions are given for specific materials in the following sections.

Sec. 203.01 Packing of Samples

It is essential that the proper type of container be used for submitting samples that require a container. All liquid materials must be shipped in tight containers and packed in sufficient absorbent material such as sawdust, excelsior, etc., to prevent leakage from the package. Samples of water must be shipped in glass or plastic containers. Samples of asphalt emulsions must be shipped in glass or plastic containers with tops that have non-metallic liners. In addition, any liquid asphalt material must also have the container secured in a plastic bag and tied to prevent leakage. All other liquids must be shipped in metal cans with lids securely fastened to prevent leakage. Locking clips to hold tops firmly in place should be used. All such packages must be marked "Liquid" and "Handle with Care". In case of glass containers, the package must be marked "Fragile" and "Glass". Mail sacks are not to be used for shipping samples of liquid, flammable, or toxic chemicals, as this can lead to the sample accidentally spilling onto the handler or other mail. When samples of other materials are shipped in cloth bags, the bags must be securely fastened with cord or wire bag ties. Wire shall not be used for fastening these bags, unless the wire can be mechanically applied and no cut ends are left exposed. Holes shall not be cut in canvas bags for the purpose of tying the tops.

Sec. 203.02 Material Safety Data Sheet

When submitting samples of materials to the Laboratory for test, it is necessary to submit with the sample a Material Safety Data Sheet (MSDS) for any material that requires such. Samples of such material will not be processed unless the MSDS accompanies the sample.

Sec. 203.03 Identification of Samples

Samples must be identified as described in the following paragraphs:

(a) Complete Information Concerning Sample

Complete information must be submitted with each sample. Forms TL-10, TL-11 and TL-13 have been furnished for this purpose. Duplicate copies of the proper form for each sample shall be completed as shown in Sec. 800.

(b) Proper Manner of Tagging Samples

A tag envelope, Form TL-3, containing a copy of the proper notification card, must always be fastened to the OUTSIDE OF THE PACKAGE. Form TL-3 should be addressed to the attention of the particular lab or person to which or to whom the sample or item is being sent. The envelope must not be used for any other purpose. Always place the gummed portion on the outside of the envelope. Placing it inside may cause it to stick to the sample card and obliterate the data thereon. If the sample is forwarded by parcel post, it will be necessary for the shipper to place the required postage stamp on the tag envelope in addition to the postage on the package.

(c) Duplicate Card

Mail duplicate TL card.

(d) Specification Reference

In the following sections, the reference to "Sec---" at the beginning of each material discussion refers to the Section of Road and Bridge Specifications, Virginia Department of Transportation.

Sec. 203.04 Shipment of Samples

Considerable economies can be effected in the transportation of samples by following the practices outlined in this section.

The fullest possible use of State cars and trucks should be made in moving samples. When Engineers are visiting a project or plant, samples should be picked up and carried to the Laboratory designated to conduct the test, or, when this is not practical, the samples should be carried to some central shipping point.

When samples are to be sent by common carrier, separate packages should be grouped to make a composite shipment and sent by the best means available. No general rule can be made as to the best means.

SECTION 204 SAMPLING MATERIALS

Sec. 204.01 Admixtures, Concrete

(Sec. 215) Concrete admixtures normally will not be sampled by the Department. These admixtures instead are approved on an annual list, which is distributed by the Materials Division. (See Sec. 209.) Manufacturers will certify annually (by mid-December) that their product has not changed in any respect since the original submission. Some admixtures are not compatible with others nor with changes in cement or aggregates. Caution should be exercised and trial mixes are suggested before using new admixtures or changing any ingredient in a mix which has good performance history. This initial approval is gained by submission of a one pint (0.5 liter) sample and independent laboratory test data indicating compliance with the specification. The Central Laboratory will conduct an infra-red scan of the sample and keep it on file. Subsequently, random samples may be drawn and new IR curves compared to those on file. Differences may result in further investigation. See Sec. 207 for modified acceptance procedure.

Compatibility of water reducing and retarder admixtures with other materials is of vital interest to the contractor and supplier because of the significant changes which can occur in placement and finishing time. Hence, changes in either the composition of materials or the sources of supply, especially admixtures or cement, should, evoke laboratory or field trial work on the part of the contractor or his concrete supplier.

Sec. 204.02 Aggregates

(Secs. 201 through 209) The minimum requirements for Independent Assurance samples of aggregates shall be in accordance with Sec. 206. See Sec. 207 for aggregates that may be approved by modified procedure. The following instructions will generally cover acceptance sampling and testing of aggregates.

(a) Sampling at New Sources

In order to avoid any semblance of encroaching in the field of commercial testing laboratories, the testing of aggregate for private interests will be avoided. This policy applies to other materials as well, but primarily applies to noncommercial local deposits. The following basic rules will help to alleviate this condition, and should be followed explicitly in the testing program.

- (1) Samples submitted for investigation tests from new non-commercial sources are to be obtained by a qualified representative of the Department. If at all possible, the aid of a Geologist should be used in order to obtain the fullest information possible.
- (2) Samples are not to be taken and submitted until adequate exploration of the area has been made, that will permit a reasonable evaluation of quantity and uniformity of the deposit to justify sampling and testing.
- (3) Complete identification information as to the source, property owner, quantity, etc., must be submitted with each sample.
- (4) Test results will be sent to the State Materials Engineer for distribution, and if sample is approved for specific uses, the submission of such sample implies it can be made available to any and all Contractors who may be interested in its use in Department work.
- (5) Samples must be submitted for test sufficiently far in advance of their anticipated use to permit completion of the necessary tests. This will permit the making available of positive advice, at time of project showings of its availability.
- (6) Instructions for proper sampling are given in the following sections concerning each of the individual materials.

(1) Stone from Local Ledges and Potential Quarries for Quality

Samples of this material shall generally be taken in accordance with AASHTO T2, except as modified herein.

For the standard quality test, at least 75 lbs. (35 kg) of crushed stone graded from 3/4 in. (19 mm) to 3/8 in. (9.5mm) shall be submitted to the Central Office or District Laboratory from each layer or ledge that appears different in color or structure. Where it is impossible to obtain crushed stone, or when there are no available means of crushing the sample, 150 lbs. (75 kg) of fresh unweathered material shall be submitted to the Central Office or District Laboratory from each layer or ledge.

All samples shall be packed and marked, in accordance with Sec. 203, using Form TL-11, as outlined in Sec. 800. Special care shall be taken to ship the aggregate in a secure container or sample bag free of contaminants.

(2) Sand and Gravel from Potential Deposits

Samples of this material shall generally be taken in accordance with AASHTO T2, except as modified herein. Potential as used here includes all undeveloped sand and gravel deposits and all developed deposits where the material is not washed or screened.

Samples of material, in which the sand and gravel are combined, shall consist of such a total weight that, on separation, the sample shall yield at least 40 lbs. (20 kg) of the lesser constituent.

All samples shall be packed and marked, in accordance with Sec. 203, using Form TL-11, as outlined in Sec. 800. Special care shall be taken to ship the aggregate in secure containers or sample bags free of contaminants. Samples containing fine sizes shall be shipped in a tight container or closely woven bag.

(b) Sampling at Established Sources

Common courtesy dictates that the Department representative always announce his presence to a company representative. In addition, Mine Safety and Health Administration Regulations require each plant to have explicit safety rules that may not be waived. Usually, this means visits to the pit or

quarry face must include accompaniment by a company designated official. These company safety rules must be strictly followed and violation by Department employees could result in administrative action. The source of aggregates must be reapproved biennially by the Materials Division for quality or at any other such time that the material quality appears to have changed. Sampling for quality will be performed by the District Materials Engineer. (See lists in Sec. 209.)

In addition to quality sampling performed by the Department, it will be necessary for the Producer to sample and test aggregates for size before shipping to the job site, in accordance with the frequencies outlined in Paragraph (b)(1) herein. See Secs. 109, 110, and 800 and Paragraph (d) herein for additional duties of Weighpersons, instructions for aggregate certifications, and use of Form TL-102A.

(1) Modified Acceptance Production Control Plan

Aggregate Producers shall be responsible for sampling and controlling their product for grading, in accordance with the modified plan outlined herein, when producing any type aggregate, other than Type I Select Material or any type subbase or base dense graded, central-mixed aggregates specified respectively in Secs. 208 and 209 of the Road and Bridge Specifications. Approval of the Producer's modified acceptance program shall in no way relieve the Producer or Contractor of responsibility for complying with all of the requirements of the contract or specifications. The program shall meet the following specific requirements.

Test and Equipment: Test procedures shall be conducted in accordance with the referenced standards as noted in the current specifications. Testing for grading and Atterberg Limits (where required) will be conducted on the Department's monitor samples. Only the grading test is necessary on the Producer's acceptance samples, unless a known problem exists. To accommodate the testing requirements, a field or plant laboratory shall be furnished and shall contain the following equipment:

- 1 - Motorized screen shaker for fine and coarse aggregate grading analysis.
- 1 - Set of sieves for the motorized shaker. The screen sizes shall include the specification sizes for the type of material being produced.
- 1 - Balance having a capacity of at least 45 lbs. (20 kg), with a sensitivity of one ounce (28 grams) or less.
- 1 - Balance having a capacity of at least 2.5 lbs. (1 kg), with a sensitivity of 0.1 gram or less.
- 1 - Drying apparatus.
- 1 - Set of liquid and plastic limit devices.

Producers producing only fine or only coarse aggregate shall have the applicable equipment.

Sampling Rate: The guide sampling rate shall be one sample per 1000 tons (1000 metric tons) per size of material produced. It is recognized that, due to production schedules, past performance, and perhaps several other factors, this rate may be changed, either up or down, for a particular operation. Therefore, the actual rate for a specific location will be at the discretion of the District Materials Engineer.

Sampling Method: With the requirements of quality assurance and Producer certification of aggregate, the method of obtaining aggregate samples for grading tests becomes more critical. Therefore, the only way statistics will be meaningful is for the sampling, by both the Department and the Producer, to be performed in a similar manner.

Samples shall be obtained from each size material produced. These samples shall be selected from barges, conveyor belts, stockpiles, or as approved by the Engineer. Sampling and testing shall be performed by qualified personnel. "Qualified" does not imply that the personnel be certified under any formal program.

Sampling of aggregate shall follow the procedures outlined in AASHTO T2 as modified herein. The shovel used for sampling of aggregates should be a square nose shovel of spade design with slightly built up edges and back, capable of penetrating full depth into the stockpile. A short handle with butt handle grip is needed to obtain the leverage to remove the sample from the stockpile. The sample size should be as outlined in Paragraph (b)(2) herein.

Five (5) types of sampling are permitted as follows:

(1) Truck Bed Sampling: For details of this type of sampling, see the Central-Mix Aggregate Quality Assurance Program (Certification Study Guide).

(2) Belt Sampling: At the request of the Producer, belt sampling may be used. A belt sample shall be a composite of 3 separately selected samples. It is recommended that each of these samples shall be taken between 2 templates inserted through the material to isolate the sample area, or by other means which will isolate the sample area on the belt, and all of the material within the sample area shall be collected. The quantity of material contained within the sample area shall be approximately 1/3 of the quantity required for the sample.

(3) Stockpile Sampling: The sample shall be made up of at least 6 shovelfuls of material secured at approximately equal spacing around the stockpile at approximately the third points of the height of the stockpile. (See instructions above on the proper shovel use.) The area to be sampled shall be opened up to expose the interior material. The shovel should be inserted nearly perpendicular to the face of the exposed material, full depth of the shovel, and raised vertically to prevent segregation. Opening up of the face may be accomplished with the use of a front end loader.

(4) Miniature Stockpile Sampling: The Producer may build a miniature stockpile using a front end loader. The material sampled will then be spread and mixed by the loader bucket and the samples taken from 3 points within the miniature stockpile.

(5) Sample Tube Sampling: A sampling tube may be used in sampling aggregate sizes smaller than the No. 10 size, and all fine aggregates. The sample tube should be 2 in. (50 mm) minimum diameter by 3 ft. (900 mm) minimum length. Samples shall be obtained of 5 different locations of the stockpile and the various samples combined to form one composite sample.

The importance of sampling is equivalent to the importance of good quality control. The primary concern of sampling is to take samples that will represent the stockpile as closely as possible and that will determine as accurately as feasible the properties of the complete stockpile.

Acceptance of Materials: Material which fails to meet the specification requirements shall not be shipped to State projects nor for State uses under any circumstances.

In the event the Engineer specifies the use of No. 57 aggregate in lieu of No. 25 or No. 26 stone to backfill soft, yielding or unsuitable foundation on contracts which do not have a contract unit price for No. 57 aggregate, an additive price, determined semi-annually by the District Materials Engineer in cooperation with the District Contract Administrator will be added to the contract unit price for No. 25, or No. 26 stone. The determination of the additive price will be based on a District wide average price differential determined by polling several quarries. This price may be obtained from the District Materials Engineer.

All materials meeting the applicable specification requirements may be shipped and accepted based on the Producer's certification, which, among other things, shall state that the required tests by the Producer have been performed and have met the specification requirements of the material. See Paragraph (d) herein for additional details of the certification.

The Producer will furnish to the Department a copy of the test results for each size material produced, on a signed, company letterhead. No particular format will be required. A worksheet or summary sheet will be sufficient.

The Producer shall keep all records pertinent to the production for a period of one year, and they shall be available for review by the Engineer.

Monitor System: The Department through the District Materials Engineer will conduct an independent assurance (monitor) testing program. The purpose of the monitor testing is to verify the adequacy and accuracy of the Producer's quality control program. One sample per week, regardless of the size material being produced, or generally one sample per month for each size produced will be obtained from the production plant. This sample shall be taken by the Producer in the presence of the District Materials Monitor, and then either quartered or introduced through a sample splitter, with each party conducting the test on their half. Monitor tests will be conducted in the District or Central Laboratory by Materials personnel. The Monitor's test results will be compared to the Producer's test results.

The Monitor's test results will in no way be used to judge acceptance. The Producer's half of the monitor sample may serve as his production sample for that day. If the comparisons indicate Monitor test results are not in relatively close agreement with the Contractor's results, an investigation will be made to determine the reason for the difference. In the event it is determined that the Contractor's test results are not representative of the product, the Department will take such action as it deems appropriate to protect the interest of the Commonwealth.

General: The Producer's quality control program shall include a system by which the District Materials Engineer will be advised as to the amount and size of material shipped to each project or order. If the Producer's quality control program is found to be unsatisfactory, the Department may withdraw approval of the source.

(2) Fine Aggregate, Course Open-Graded Aggregate, and Crusher Run

Sampling aggregate for either quality or grading control shall follow generally the procedures outlined in AASHTO T2. For quality, segregation of the individual particles is not important, for they will be recombined into the testing sizes needed in the laboratory. Therefore, for coarse aggregate, a sample of approximately 40 lbs. (20 kg) each of #8 and #57, if available, will generally be sufficient to conduct quality tests. For fine aggregate, a single 40 lbs. (20 kg) sample is sufficient.

To determine grading compliance, the sampler must be very careful and the procedures outlined in Paragraph (b)(1) above followed exactly. When at all possible, samples should be taken at a point other than in stockpiles to reduce the error inherent with stockpile segregation. A sample of approximately 10 lbs. (5 kg) is usually sufficient for fine aggregate and one of 30 lbs. (15 kg) for coarse aggregate. Open graded aggregates and Grading A fine aggregate shall be tested for minus 200 material by washing prior to the dry gradation being performed.

All samples shall be packed and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Special care shall be taken to ship the aggregate in a secure container or sample bag free of contaminants.

(3) Dense Graded Aggregates

This material is accepted under a statistical based, quality assurance system where the Producer samples the material for grading, Atterberg limits, cement content, and moisture content, as applicable. The Department's responsibility with regard to sampling is to secure a Independent Assurance (monitor) sample in accordance with the frequency specified in Paragraph (c) herein. The Producer is to sample in accordance with the Department's current Quality Assurance Policy.

(4) Dry Riprap

It is essential that contractors furnish and place the class of dry riprap specified on the plans. Although dry riprap is primarily mechanically sized during production as other aggregates are, the acceptance of riprap relies primarily on visual inspection for size and percentages to meet the Departments Specifications. Thus to avoid project delays and minimize material rejections the Project Inspector is to use the following procedures:

Stockpiled Dry Riprap - Verify the size and acceptability of the material at the quarry prior to shipment.

Dry Riprap to be shipped as it is produced - Establish by visual inspection with the contractor and the producer the size and percentages required to met the Department's Specifications.

The Contractor should furnish a sample of the minimum to maximum size riprap at the project site to be used for visual comparison of riprap delivered to the project and a sample should be maintained at the quarry for the producers benefit. In the event a shipment is questionable as to whether it meets specifications, the District Materials Engineer will make the final determination as to acceptability.

(5.) Sizes No. 1, No. 2, No. 3, and Gabion Stone

Except for use in hydraulic cement concrete, aggregate size No. 1, No. 2, No. 3 and Gabion Stone may be inspected visually for size, cleanliness, and general conformance to the specified grading. Gradation testing will be performed in the event of dispute.

(c) Field Sampling

Since source testing and acceptance will be provided almost in every case, field sampling and inspection normally will be limited to observation for cleanliness and segregation problems. Should material arrive on the job site without inspection, the District Materials Engineer's Office should be notified before allowing its use.

The minimum requirements for job acceptance sampling of aggregate, if necessary at the job site, shall be as outlined below:

(1) Fine and Coarse Aggregate for Use in Hydraulic Cement Concrete

Acceptance samples for grading should be taken at the rate of one per size per 1,000 tons (1,000 metric tons).

(2) Crusher Run (Sizes 24, 25, & 26), Fine Aggregate for Other Uses, and Surface Treatment Aggregates

Same as Paragraph (c)(1) above. Requirements for documentation of weights will be as outlined in Paragraph (e) herein.

(3) Dense Graded Aggregates for Use As All Types of Base and Subbase Material and Type I Select Material

This material will be sampled at a frequency as outlined in Sec. 300, and weight documented as outlined in Paragraph (e) herein.

(4) Fine and Coarse Aggregates for Use in Asphalt Mixtures

If from a normal approved source, no further sampling is necessary since there are no grading requirements. If the source is new, which usually occurs in the case of local sand pits, it shall be sampled for quality in accordance with Paragraph (b) above. If there is reason to believe the quality has changed or visual changes have occurred in cleanliness, samples may be drawn for investigation.

(d) Certification of Aggregates

When fine aggregate and open graded coarse aggregate is shipped to the job site and has been tested and approved at the source, each load of aggregate shall be accompanied by a materials certification statement signed (either handwritten signature, handwritten initials, or computer printout of name or initials) by a responsible company official. This applies to such aggregates as fine aggregate, coarse aggregate for use in hydraulic cement concrete, aggregate for use in surface treatment work, rip-rap bedding stone, porous backfill stone, and crusher run aggregate, although crusher run is not an open graded aggregate. The certification may be stamped or printed on the delivery ticket, invoice, or weigh ticket, or it may be a separate document altogether. This does not apply to aggregate or plant mix materials paid for on a tonnage basis, as outlined in Paragraph (b)(1) above. See Paragraph (e) herein.

(e) Documentation of Weights

A bonded Weighperson employed by the Producer is responsible for furnishing a daily summary sheet to each order and/or contract. See Sec. 800 for examples of the bond and daily summary sheet. This sheet is to be delivered by the Producer to the Department representative at the project or work area no later than the end of the next working day. On intermittent shipments, this form may be mailed to the appropriate Residency. Recipient of the summary sheet will then reconcile it against the delivery tickets. Any differences must be resolved. This summary sheet, at the end of the project, must be turned in to the District Drafting Room for checking against the final estimate and the weigh tickets. Afterwards, it shall be forwarded to the State Materials Engineer.

(f) Reports

Laboratory test reports of aggregate materials will be made on Forms TL-22, TL-22A, and TL-22B respectively, as outlined in Sec. 800. Shipments of aggregate materials paid for on a tonnage basis will be recorded on a daily summary sheet. (See Paragraph (e) above.) Occasionally, physical tests of aggregates for use in asphalt concrete will also be reported on Form TL-50, as outlined in Paragraph (c)(4) above and Sec. 800. Physical tests and shipments of central-mixed aggregate materials will be reported on Forms TL-52B (computer test report output form) and TL-102A respectively, as outlined in Sec. 800.

Sec. 204.03 Aluminum Alloys

(Sec. 229) Aluminum alloys (sheet, plate, etc.) are approved for use by the Materials Division from Manufacturer's certified physical and chemical analyses. Inspection, other than visual, is not required by the field, and sampling will not be necessary. See Sec. 207 for modified inspection procedure.

Aluminum which will be in contact with concrete is coated with a bituminous, solvent type, asbestos filled, and aluminum pigmented coating. This coating will be sampled the same as outlined for paint in Sec. 204.24.

Aluminum sign blanks are accepted on visual inspection, with an occasional sample to be checked for dimensional requirements of the specifications (thickness, etc.) For other specific aluminum items, see Fencing, Pipe, and Poles and Posts herein.

Sec. 204.04 Bearing Pads and Bedding Materials

(Sec. 237) See Sec. 207 for materials that may be approved by modified acceptance procedures.

(a) Elastomeric Bearing Pads

Samples shall consist of 2 full size pad sections of each thickness to be selected at random. A sample of 2 pads shall be submitted to the Central Office Laboratory for tests from each shipment of 300 pads or less, with one additional pad being submitted for each additional increment of 300 pads, or fraction thereof.

Each sample shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(b) Sheet Lead and Common Desilverized Lead Bedding Material

This will not require sampling. The material may be approved for use by visual inspection, as outlined in Sec. 207.

(c) Preformed Fabric Bedding Material

(237.02) Samples shall consist of 1 piece 6" by 6"

(150 by 150 mm) by full thickness per lot or batch. The samples are to be submitted to the Central Office Laboratory for testing.

Each sample shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(d) Reports

Laboratory tests and inspections of bearing pads and bedding materials will be reported on Forms TL-23, TL-47, or TL-109 respectively, as outlined in Sec. 800.

Sec. 204.05 Asphalt Material, Liquid

(Specification reference - Sec. 210)

(a) General

Asphaltic materials will be accepted under the VDOT Asphalt Acceptance Program (VAAP). This involves the sampling, testing, documentation and certification of the product by the manufacturer in combination with a Department monitoring effort. VDOT reserves the right to discontinue acceptance of asphaltic material in the event that verification test results indicate that non-specification material is being provided or test procedures are not being followed.

The manufacturer must perform the following responsibilities himself or with the assistance of a VDOT approved commercial testing agency. Asphaltic materials must be sampled at appropriate

frequencies and tested in accordance with the specified methods. A file of certified test reports representing the asphaltic material must be maintained. A copy of the certified test report must be provided to the VDOT Materials Division at Elko. Cooperation with VDOT and/or its representatives during periodic inspections of manufacturer's testing facilities, during collection independent assurance (I.A.) (monitor) samples, and during verification of certified test reports is required.

Each manufacturer will detail what steps it will take, from a Quality Control standpoint, to make sure that the material has not been contaminated or experienced changes in tested properties during shipment or in storage. It is the intention of this program that all tanks of material will be tested unless another program is worked out with VDOT.

Asphaltic material manufacturing facilities will be inspected by VDOT personnel or its representatives on an intermittent basis.

(b) Sampling at the point of manufacture, terminal, or other designated site

Samples are to be taken in accordance with AASHTO T40, as modified herein.

Samples taken for testing of asphaltic materials are to be not less than one quart (one liter) of material (0.5 gallon (2 liters) for asphalt emulsions). Care is to be taken to ensure that the samples are not contaminated and that the sample containers are perfectly clean and dry before filling. Immediately after filling, the sample containers are to be tightly closed, and properly marked for identification on the container itself.

Containers for liquid asphalt materials (asphalt cements and cut backs) are to be double friction top cans, oblong cans with screw tops, or small mouth cans with screw caps. Containers for emulsified asphalt are to be wide mouth jars or bottles made of glass or plastic - never metal containers.

Manufacturer's control sampling is to be conducted at the point of manufacture unless otherwise arranged with VDOT. Each company is to submit a proposal of sampling procedures to VDOT, detailing sampling frequency, location and quantity represented by each sample. Upon acceptance of this proposal by the Department, the manufacturer must abide by the procedures accepted, unless other arrangements are made with VDOT.

Verification of manufacturer's testing procedures will be accomplished by independent assurance (monitor) sampling and testing of the material at periodic intervals. Monitor samples will be taken at the terminal under the supervision of VDOT personnel or its representative. The sample taken for monitor acceptance will be a "split" sample, with the manufacturer testing a portion of the sample and VDOT's Central Materials Laboratory at Elko testing the other portion. The planned testing frequency will be at a minimum of 1 test per month per type/grade of asphaltic material that has been supplied to VDOT projects during the previous month. This sampling frequency will be maintained during the construction season, with a lesser frequency during the remainder of the year. After collection, containers of monitor samples, for testing by VDOT, are to be cleaned on the outside and marked according to Section 203, using form TL-10, as outlined in Section 800, and submitted to VDOT's Central Office Materials Laboratory at Elko for testing. Packaging is to be such that breakage and leakage of asphaltic material is prevented. Due to the time delay in shipping samples to the VDOT facility at Elko, the portion of the monitor acceptance sample to be tested by the manufacturer should be allowed to cool overnight before testing. The sample will be labeled with the terminal code number/tank number/sample number/A or B. The A portion will be sent to Elko for testing while the B portion is sent to the asphalt supplier's testing facility. Both samples will be labeled the same except for the A or B designation. VDOT will be responsible for the shipping of its sample; the terminal or asphalt company will be responsible for the shipping of its sample.

A quality assurance (Q.A.) program will be accomplished with independent sampling and testing of the asphaltic material. Q.A. samples will be taken from the plant storage tank at the asphalt plant for asphalt cements, or on the project for cutbacks and emulsions by a VDOT employee. QA samples will be taken at the rate of one sample per district per year per type/grade of asphalt.

(c) Testing of Material

The manufacturer is to conduct the standard control tests on asphaltic materials as detailed in the appropriate section below. Testing for certified test reports is to be performed by the manufacturer's personnel in the manufacturer's VDOT approved laboratory or by a VDOT approved commercial testing facility. The Department will conduct tests on independent assurance (monitor) samples and on the Q.A. samples at the Elko Materials Laboratory.

Laboratories conducting either quality control, independent assurance (monitor), or Q.A. testing must be certified by VDOT as meeting the requirements of one of the three following levels of certification:

Level I AASHTO Accreditation.

Provide VDOT with a copy of accreditation.

Level II AMRL Certification.

Provide VDOT with Copies of last AMRL inspection and/or last "Round Robin" results, with ratings, for each type of asphaltic material tested and copies of the lab's response for each sample.

Development of a calibration program and personnel record keeping procedure, with results to be kept on file at site.

Level III Meets neither I or II.

Development of a calibration program and personnel record keeping procedure, with results to be kept on file at site.

VDOT will certify lab by actual observation of testing.

All Level III testing facilities performing quality control, independent assurance (monitor), or Quality Assurance testing will be evaluated periodically. VDOT Materials personnel will visit the testing laboratories and inspect/approve testing equipment and procedures for conformance to appropriate AASHTO Standards. VDOT will perform the inspection using a checklist to systematically evaluate the equipment and procedures of each method.

All laboratories conducting quality control, independent assurance (monitor), or Quality Assurance sampling, regardless of level of certification, will designate a single person to act as liaison with VDOT. This person will perform and/or oversee the performance of certification testing.

Certified Test Reports for ASPHALT CEMENTS are to be based upon the results of tests performed in accordance with AASHTO M226, table 2. However, the manufacturer will not be required to perform the Cleveland Open Cup, Ductility and Solubility tests unless otherwise directed by the Engineer. VDOT will perform Ductility and Solubility tests on all independent assurance (monitor) and Q.A. samples. Cleveland Open Cup tests will be performed by VDOT periodically. When performed by VDOT, failure of either sample on Cleveland Open Cup, Ductility or Solubility will be considered sufficient reason to require the manufacturer to perform this testing. If the manufacturer elects to conduct these tests to help better control production, the results are to be included on the certified test report.

Certified Test Reports for CUTBACK ASPHALTS are to be based upon the results of tests performed in accordance with AASHTO M81 and M82 as applicable. However, the manufacturer will not be required to perform the Flash Point, Ductility and Solubility tests unless otherwise directed by the Engineer. VDOT will perform Ductility and Solubility tests on all independent assurance (monitor) and Q.A. samples. Flash Point tests will be performed by VDOT periodically. When performed by VDOT, failure of either sample on Flash Point, Ductility or Solubility will be considered sufficient reason to require the manufacturer to perform this testing. If the manufacturer elects to conduct these tests to help better control production, the results are to be included on the certified test report.

When CUTBACK ASPHALTS are used in surface treatments, the Coating Ability test will be conducted subject to the specifications listed in Section 210.02 of The Road and Bridge Specifications.

Certified test results for EMULSIFIED ASPHALTS are to be based upon the results of tests performed in accordance with AASHTO M208, as specified below.

Cationic Emulsions - Table 1, specifically

Tests on emulsions:

Saybolt Furol Viscosity
Sieve Test (if necessary)
Demulsibility or Classification test
Particle Charge Test
Residue by Distillation

Test on residue from distillation:

Penetration

CSS-1h (Quick Set) - as above plus

Quick set Emulsified Asphalt Setting Time (VTM-89)

Latex modified cationic emulsions (Quick Set) CQS-1H

Tests on emulsions:

Saybolt Furol Viscosity,
Particle Charge
Sieve Test (if necessary)
Residue by Evaporation (VTM-78)

Test on Residue:

Penetration
Ring and Ball softening point

CRS-2 Latex Modified

Saybolt Furol Viscosity
Particle Charge
Sieve Test (if necessary)
Residue by Distillation

Penetration
Ring & Ball Softening Point
Elastic Recovery

The manufacturer will not be required to perform the Ductility and Solubility tests unless otherwise directed by Engineer. VDOT will perform Ductility and Solubility tests on all latex modified cationic emulsions, independent assurance (monitor) and Q.A. samples. When performed by VDOT, failure of either sample on Ductility or Solubility will be considered sufficient reason to require the manufacturer to perform this testing. If the manufacturer elects to conduct these tests to help better control production, the results are to be included on the certified test report.

Certified test results for SUPERPAVE BINDERS are to be based upon the results of tests performed in accordance with AASHTO PP 26, as specified below.

Original Material:

Flash Point ⁰C

AASHTO T 48

Viscosity @ 135 ⁰ C/100 ⁰ C	ASTM D 4402
Dynamic Shear, 10 Rad/sec.	AASHTO TP 5
RTFO (AASHTO T 240):	
Mass Loss %	AASHTO T 240
Dynamic Shear, 10 Rad/sec.	AASHTO TP 5
Pressure Aging Vessel, Residue @ 100 ⁰ C (AASHTO PP 1)	
Dynamic Shear, 10 Rad/sec.	AASHTO TP 5
Creep Stiffness, 60 sec.	AASHTO TP 1
Physical Hardening	AASHTO TP 1
Direct Tension, 1.0 mm/min	AASHTO TP 3

(d) Test Reports

The manufacturer is to maintain a file of certified test reports for all asphaltic materials ultimately shipped to Contractors that perform work for VDOT. These certified test reports will indicate that the material shipped meets the requirements of that type/grade of asphaltic material and will show the test results that were obtained on that material to determine compliance with the applicable specifications. These records are to be kept by the manufacturer for at least 12 months and are to be available for verification by VDOT personnel. A copy of the certified test report is also to be sent to the VDOT Materials Division at Elko.

The certified test report must be a company's standard form containing the following information:

- 1) Manufacturer's name and address
- 2) Type and grade of asphaltic material
- 3) Testing performed (AASHTO or Virginia Test Method designation)
- 4) Test results and date obtained
- 5) Quantity represented
- 6) Tank number
- 7) Unique Report Identifier
- 8) A statement indicating that the manufacturer "certifies that these are the test results obtained on the material tested under the VAAP Program.

(e) Manufacturer's Tracking System

The manufacturer is to submit to the Department a detailed plan of action describing the procedures to be taken to ensure tracking of sample test results and the material represented by these results.

(f) Shipping Documents

All shipping documents will contain sufficient information such that at any point, the material may be "back tracked" to the original test results. If material is mixed with other approved material for storage, the record system will be such as to assure the traceability of all the material which is being mixed. All shipping documents will be accompanied by a statement similar to "We certify that all material being shipped on this invoice/bill of lading has been tested and approved under the Virginia Asphalt Acceptance Program and that the material has been loaded under the supervision of our representative into carriers that are suitable for shipment of this material.

All shipping documents are to be kept by the recipient of the material for at least 12 months and are to be available for verification by VDOT personnel.

Only material tested and certified in accordance with the VAAP may be mixed and shipped to VDOT projects.

(g) End-Use Certifications

Each producer of asphalt cement concrete plant mix or slurry seal mix for use on VDOT projects must state on all mix designs submitted for VDOT approval that "only asphaltic materials tested and certified according to the VDOT Asphalt Acceptance Program will be used to produce this mix". The mix producer will maintain a file of VAAP Certifications of Testing to support this statement.

Asphaltic material for use on VDOT projects, which will be used in the same form as received, e.g., prime, tack, surface treatments, etc., will be shipped to the project accompanied by a Certification of VAAP Testing. This certification will be submitted to the project inspector for inclusion in project records. These certifications may be stamped or printed on the delivery ticket, invoice, or weigh ticket, or it may be a separate document altogether.

(h) Asphalt Usage

In addition to the required certification, manufacturers, or other suppliers as designated by the Engineer, will submit, to the Materials Division at Elko, on a quarterly basis, a summary sheet of quantities shipped for state work. This summary sheet will show the number of gallons (liters) of each type/ grade of asphaltic material shipped to Virginia addresses and accumulated by the Districts to which it is shipped.

Sec. 204.06 Asphalt Mixtures

(Sec. 211) Asphalt mixtures (asphalt concrete) shall be sampled, as outlined in Sec. 500.

Sec. 204.07 Brick

(Sec. 222) See Sec. 207 for acceptance of brick on modified inspection procedures. Brick in orders of 1000 or less may be accepted in this manner. Otherwise brick shall be sampled in accordance with AASHTO T32. At least 10 bricks shall be sampled from each lot of 50,000 brick, or fraction thereof.

For lots of more than 500,000, 5 shall be sampled for each 100,000 or fraction thereof, but not less than 10.

Samples shall be submitted to the District or Central Office Laboratory, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(a) Reports

Laboratory tests, plant inspections, and shipments will be reported on Forms TL-29, TL-109, and TL-9 respectively, as outlined in Sec. 800.

Sec. 204.08 Bronze and Copper Alloy

(Sec. 230) Cast bronze and copper alloy may be accepted on modified inspection procedures, as outlined in Sec. 207, provided the Materials Division has received a Manufacturer's certified physical and chemical analysis representing the material.

Sec. 204.09 Cement, Hydraulic

(Sec 214) See Sec. 207 for details of modified acceptance procedures for cement.

Hydraulic cement may be accepted in any job by means of a letter from the Cement Company certifying it meets specification requirements, as outlined herein.

The Mill's control laboratory will be inspected regularly by the Cement and Concrete Reference Laboratory of the National Bureau of Standards. A minimum time between inspections is not established; however, it is expected that the Mill will request an inspection for each tour made by the CCRL team. The Mill will supply a copy of this report together with any correspondence regarding deficiencies to the State Materials Engineer.

The Mill will assure the Department of its quality control program by stating in detail its frequency of sampling and testing and other production control. Any changes shall be reported immediately to the State Materials Engineer.

In addition, the Cement Company will furnish the State Materials Engineer a certification letter annually. This letter will contain wording similar to the following:

"Company Letterhead

_____ Project Number _____

Date

Dear Sir:

The cement to be furnished during 19__ will be produced at _____(mill) _____. We certify it will be manufactured under our normal quality controlled processes and will, based on our test results, meet the requirements of Type _____, Virginia Department of Transportation's Specifications."

This letter is to be signed by a responsible company official and should be mailed about mid-December each year. Distribution of this certification letter will be made immediately by the State Materials Engineer to the District Materials Engineer.

The mill will also furnish the State Materials Engineer a copy of the complete tests on all bins from which shipments will be made. Bin numbers should be designated in such a manner that the lot in the bin can be identified with the date shipped. It will be satisfactory to submit this report after the 28 day strengths are complete. IT IS NOT DESIRED TO RELATE THIS REPORT WITH A PARTICULAR PROJECT.

Upon shipment of cement to a project, the Mill will enter on the delivery tickets the date, bin number, and truck or rail car number. The bin number used will be that of the Mill and not one of an intermediate terminal.

Where cement is paid for by the ton (metric ton) as a bid item in the contract (soil-cement stabilization), weights will be determined by a digital printer scale.

The truck will be weighed before loading and after loading to determine the net amount delivered to the project. Scales will be sealed and approved. Copy of this ticket will be delivered to the Inspector with the shipment of cement. The Inspector will visually inspect each truck after discharge and prior to its leaving the job site. Should the truck not be completely emptied, a corrected weigh ticket must be prepared and supplied to the Inspector.

Sec. 204.10 Snow and Ice Control Materials

(a) Solids

(Sec.239) Solid – snow and ice control materials shall be sampled and approved in the manner outlined herein. This control system is designed to improve the flow into the State of approved snow and ice control materials, so that the delivery and emergency use of nonconforming material will be reduced to a minimum.

1. Sodium Chloride

(a) Sampling

Whenever it is economically feasible and inspection service is available, sampling will be done at the manufacturers' stockpiles, from containers or indoor storage. Sampling will be at the approximate rate of one sample per 10,000 tons (10,000 metric tons) at stockpile locations or one sample per 5,000 tons (5,000 metric tons) if sampled at final destinations. No samples shall be taken from uncovered stockpiles while it is raining. Sampling shall be performed in accordance with ASTM D 632. A minimum of three (3) sample increments shall be selected at random from the lot (10,000 or 5,000 tons) (10,000 or 5,000 metric tons). Each increment shall be obtained by scraping aside the top layer of material to a depth of at least one inch (25 mm) and taking a one-pound (2 kg) quantity of sodium chloride to a depth of at least six inches (150 mm). The sample increments shall be thoroughly mixed and quartered (in accordance with ASTM C702) to constitute a composite sample. The minimum required composite sample size is one quart (one liter).

All samples shall be submitted to the Central Office Laboratory in either a metal paint can with an air-tight cover or a plastic cylindrical concrete mold container with the cover firmly attached and marked, in accordance with Sec. 203 and Sec. 800.

All shipments shall be subject to visual inspection at destination before unloading. Any shipments deemed to be unusable because of excessive water, oversized material or extraneous material maybe rejected at the option of the Engineer. In the case of storm events, the Engineer reserves the right to accept and use any product delivered and to apply price adjustments as defined in the purchase contract. A sample may be taken for analysis to determine the price adjustment.

(b) Shipment

When shipments are made from out of state stockpiles, an inspection service will be provided when the frequency of shipments makes it economically justified. The Supplier shall certify that the material came from an approved stockpile and the stockpile's location shall be on the shipping ticket.

(c) Rejection

Delivered material not conforming to the specification may be subject to a price adjustment or rejected and returned at the Producer's option. Material not conforming and not returned will be subject to the price adjustment schedule in the purchase contract. In no case will the price adjustment of any retained material be over 50%. Inspection Reports (Form TL 109) shall be provided to the residencies.

2. Calcium Chloride and Magnesium Chloride

Calcium chloride and magnesium chloride will be sampled at the rate of one sample per manufacturer per District. Sampling shall be conducted in accordance with ASTM D 345. For bag shipments, select not less than three containers at random. Take 1 lb (0.5 kg) samples by means of a sampling tube penetrating at least 1 ft. (300 mm) into the bag. For small containers with capacity of less than 10 lbs. (5 kg), use the entire contents of the container. For bulk shipments, select increment samples from at least three locations in the shipment. Scrape aside the top layer to a depth of one foot (300 mm). Using a sampling tube, obtain a sample extending from the cleared surface to at least 50% of the depth of the material in the container, or a depth of approximately three feet (one meter), whichever is less. Mix the increment samples together and fill the one-quart (one liter) container. Use caution during the sampling operation to avoid exposing the sample unduly to atmospheric moisture. If more than one sample is taken, immediately and thoroughly mix the individual samples to form a representative composite sample of material and store in a sealed plastic container. Sample shall be submitted to the Central Office Materials Laboratory in a plastic airtight container (plastic cylindrical concrete mold containers are acceptable) in accordance with Sec. 203 and Sec. 800.

3. Calcium Magnesium Acetate

Calcium Magnesium Acetate (CMA) will be sampled at the rate of one sample per manufacturer per District. Three (3) sample increments shall be selected at random from the lot. Each increment shall be obtained by scraping aside the top layer of material to a depth of six inches (150 mm) and taking a half-pound (0.25 kg) quantity to a depth of six inches (150 mm). The sample increments shall be mixed to constitute a composite sample. The sample size shall be one quart (one liter) and shall be submitted to the Central Office Materials Laboratory in a metal paint can with an airtight cover in accordance with Sec. 203 and Sec. 800.

4. Solids with Agricultural Processing Residue

These snow and ice control materials shall be stored undercover and protected from cross contamination from other snow and ice control materials. They will be sampled at the minimum rate of one sample per manufacturer per District. The sample size shall be one quart (one liter) and shall be submitted to the Central Office Materials Laboratory in an airtight metal paint can or air-tight plastic container in accordance with Sec. 203 and Sec. 800.

(b) Liquids

Liquid snow and ice control materials shall be sampled and approved in the manner outlined herein. This control system is designed to improve the flow into the State of approved liquid snow and ice control materials, so that the delivery and emergency use of nonconforming material will be reduced to a minimum.

Samples taken for testing of liquid snow and ice control materials shall be not less than one quart (one liter) of material. Sample container shall be plastic Nalgene Wide Mouth plastic container with an airtight seal. Sampling shall be done in accordance with ASTM D345 and shall be taken from the storage container during discharge. Before sampling, the solution shall be recirculated in the tank until it is homogenous. Care shall to be taken to ensure that the samples are not exposed unduly to atmospheric moisture. Samples shall be taken when the temperature is above 40 °F (4°C). The temperature of the material at sampling shall be recorded on the TL-10 card. Samples shall be submitted to the Central Office Materials Laboratory in accordance with Sec. 203 and Sec. 800. Samples will be taken each year at the time of the first liquid snow and ice control material delivery. The frequency of sampling shall be a minimum of one sample per manufacturer per District.

Sec. 204.11 Concrete, Hydraulic Cement

(Sec. 217) Hydraulic cement concrete will be sampled, as outlined in Sec. 400.

(a) High Strength Grout and Mortar

(218) High-strength grout and mortar may be accepted on any job by means of a letter of certification from the manufacturer, which shall include independent laboratory results showing the following: the grout/mortar develops a 7-day compressive strength of at least 4000 pounds per square inch (28 MPa) when tested in accordance with ASTM C-109, a 7 day bond strength of at least 1000 pounds per square inch (7 MPa) when tested in accordance with VTM-41 except that epoxy was not used to develop the bond, and compliance with ASTM C-1107.

Sec. 204.12 Copper Sheet and Strip

(Sec. 230) Copper sheet and strip shall be accepted on modified inspection procedures, as outlined in Sec. 207, since no testing or certification is required.

Sec. 204.13 Curing Materials and Protective Coatings for Concrete

(a) Curing Materials

(Sec. 220) Materials used for the curing of hydraulic cement concrete shall be sampled as follows:

(1) Liquid Membrane Seal

Liquid membrane seal shall be shaken or stirred thoroughly in the container, much as described for paint in Sec. 202.24, before the sample is taken. A one quart (one liter) sample shall be taken at random from a single container representing each specific lot, batch, or other unit of production in a shipment, provided that no sample shall represent more than 5000 gals (20,000 liters).

Each sample shall be packed and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. A metal container, properly capped, may be used for sample shipment to the Central Office Laboratory.

(2) Burlap and Polyethylene Sheeting

Burlap and sheeting shall be sampled by obtaining one sheet 4 ft (1 m) by width of roll and submitting this to the Central Office Laboratory for test. One sample shall represent each specific lot, or other unit of production in a shipment.

A packaging envelope may be used for sample shipment. Each sample shall be packed and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(3) Polyethylene Sheeting

(Same as Paragraph (a)(2) above.)

(4) Waterproof Paper

Waterproof paper shall be sampled the same as outlined in Paragraph (a)(2) above.

(5) Monomolecular Film

Chemicals, such as monomolecular film, used in the placement of concrete to prevent or reduce evaporation of curing water from the concrete surface, will require no sampling, testing, or

certification, and may be accepted on modified inspection, as outlined in Sec. 207. Satisfactory job performance will be considered as proof of acceptance.

(6) Reports

Laboratory tests and inspections of curing materials will be reported on Forms TL-24 and TL-109 respectively, as outlined in Sec. 800.

(b) Protective Coatings

Materials used for the protection of hydraulic cement concrete surfaces shall be accepted as follows:

(1) Silicone Treatment

Silicone spray treatment, applied to hydraulic cement concrete surfaces where unpainted ASTM A588 steel is used, shall be sampled by obtaining a one quart (one liter) sample of the treatment, either at the source or at the job site. The sample shall be submitted to the Central Office Laboratory for test in a clean, airtight, metal or glass container. One sample per job will be sufficient.

The sample shall be packed and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(2) Spray-On Surface Finish

Materials used as spray-on surface finishes for hydraulic cement concrete surfaces are approved for use by an approved list. Inspection, other than visual, is not required in the field, and sampling will not be necessary. See Sec. 207 for modified inspection procedures.

(3) Reports

Laboratory tests and inspections of silicone treatments will be reported on Forms TL-47 and TL-109 respectively, as outlined in Sec. 800.

Sec. 204.14 Electrical Conduits, Fittings, and Boxes

(Secs. 238, 703, and 705) See Sec. 207 for materials that may be accepted on modified inspection procedures.

(a) Acrylonitrile-Butadiene-Styrene (ABS) Conduit and Fittings

ABS conduit shall be sampled by obtaining one full length of conduit for each size diameter per shipment. Fittings may be accepted on modified inspection, as outlined in Sec. 207, since these do not require testing or certification. However, these shall be made of the same or equivalent material as the conduit.

All samples shall be submitted to the Central Office Laboratory loose, with Form TL-10 attached. The samples shall be marked and shipped, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(b) Metal Conduit and Fittings

Metal conduit shall be accepted from one of the following: Manufacturer's certification, catalog cut or the Virginia DOT Pre-Approved Traffic Control Device Listing from Mobility Management. At the discretion of the Engineer to determine acceptance, metal conduit shall be sampled by obtaining 2 pieces, one from each end of one length of pipe, for each size diameter per shipment. The lengths of

the 2-piece sample shall be a minimum of one 8 in. (200 mm) piece from each end. The samples should be sawed true from the ends of a length picked at random.

Fittings shall be approved by modified inspection, as outlined in Sec. 207, provided that the Materials Division has received a Manufacturer's certified analysis of the test report, which includes the zinc content.

Samples shall be packed, marked, and shipped the same as outlined in Paragraph (a) above.

(c) Plastic and Poly (Vinyl Chloride)(PVC) Conduit and Fittings

Plastic and PVC conduit and fittings may be accepted on a manufacturer or supplier certification stating that only PVC, Schedule 40, UL approved conduit will be used. Verification that Schedule 40 is being used may be made through the District Materials Office. It is not absolutely necessary that the same brand of material be used in the same installation, as long as the parts "mate" and meet the above criteria. Any certification which are incomplete will be denied and sampling will be required. The sample shall be minimum of 2 ft. (0.6 m) in length, and contain the UL label.

(d) Plastic and PVC Telephone Conduit

Telephone conduit may be accepted on Manufacturer or Supplier Certification stating the specifications for and type of conduit.

(e) Boxes

Boxes, except junction boxes, require no sampling, and may be accepted on modified inspection, as outlines in Sec. 207, since these require no testing or certification. For concrete junction boxes, two (2) 6 X 12 in. (150 X 300mm) or three (3) 4 X 8 in. (100 X 200 mm) cylinders will be obtained and tested on a random basis. For metal junction boxes, thickness of coating will be tested on a random basis using a magnetic thickness gauge, in a manner similar to that specified for coated corrugated steel pipe in Sec. 204.26(h).

(f) Other Electrical Components

Electrical materials, supplies, and equipment, other than those noted above, used in traffic signal installations or other types of electrical systems, will usually be accepted on the basis of Manufacturers' certifications, catalog cuts (under certain conditions), and/or, generally in the case of traffic control materials and equipment, accepted on the basis of the Pre-Approved Traffic Control Device Listing published by the Traffic Engineering Division. This includes such items as, electrical wire and cable (conductors and ground wires conforming to ASTM B3 and B8, or B2 respectively, or other specified and approved types), connectors and terminals, controllers, detectors, insulators, junction, splice, and switch boxes, controller cabinets, lamps, switches, relays, and traffic signal heads, among others. See Sec. 207 for additional details of acceptance of these items by modified inspection and certification/catalog cut/Pre-Approved List.

For acceptance of electrical system structural elements, such as wood poles, steel poles (anchor base, mast arm, luminaire, etc.), steel plates, high strength steel bolts, ground clamps, anchor rods and span and guy wire, see Secs. 204.28, 204.33, 204.32, 204.36, and 207 respectively.

(g) Reports

Laboratory tests of acrylonitrile-butadiene-styrene (ABS) and bituminous conduit will be reported on Form TL-29, laboratory tests of cylinders will be reported on Form TL-26,(TL-26 B, if computerized test report output form), laboratory tests of metal conduit will be reported on Form TL-25, and inspection will be reported on Form TL-109, as outlined in Sec. 800.

Sec. 204.15 Epoxy Resins

(Secs. 212, 223, and 243) A sample of epoxy resin shall consist of one qt. (one liter) of the lesser component and enough of the larger component for proper mixing. Epoxy loop sealant, for use in traffic signals and conforming to Sec. 212, Road and Bridge Specifications, shall be tested in the Central Office Laboratory, and shall likewise be sampled as outlined herein. One sample shall be submitted to the Central Office Laboratory representing each lot or shipment. Contents being sampled should be mixed thoroughly before sampling. Samples shall be shipped in clean cans, each component in a separate can and shall contain the following information clearly labeled on the containers: (1) identity of component, (2) type, (3) mixing directions, (4) usable temperature range, (5) name of Manufacturer, (6) lot or batch number, (7) date of packaging, (8) pigmentation if any, and (9) quantity contained therein in lbs. (kg) and/or gals (L). When the quantity is 15 gals. (60 L) or less for any one project, epoxy resins may be accepted on Manufacturer's certification, as outlined in Sec. 207.

Samples shall be marked and shipped, in accordance with Sec. 203, using Form TL-10, as outlined in Sec 800. Laboratory tests and inspections of epoxy resins will be reported on Forms TL-30 and TL-109 respectively, as outlined in Sec 800. Powdered epoxy resins are accepted by an approved list. (See Sec. 209).

Sec. 204.16 Fencing

(Sec 242) For fencing that may be approved on modified inspection, see Sec. 207.

(a) Chain-Link Fencing

This shall be sampled as follows. One sample shall be taken from each of 3 rolls selected from each 50 rolls, or fraction thereof, in a shipment. The sample thus selected shall consist of a woven length which should include at least 6 vertical wires for the full width top to bottom, and shall be taken from the end of the roll. Rods, fittings, and gates for chain-link fence, including electrical ground rods, wire, and clamps, may be accepted on modified inspection, as outlined in Sec. 207.

(1) Tension Wire

Tension wire for use in chain-link fence shall be sampled, as outlined in Paragraph (b)(1) below.

(b) Standard Fencing

(1) Barbed Wire

Barbed wire fencing shall be sampled by selecting at random one spool from every 50 spools, or fraction thereof, in a shipment. The sample shall consist of one strand, 3 ft. (1 m) long, cut from the end of the spool. Rods, fittings, and gates for standard fencing, including electrical ground rods, wire, and clamps, require no sampling, and may be accepted on modified inspection, as outlined in Sec. 207.

(2) Lawn

Lawn fence requires no sampling, and may be accepted on modified inspection, as outlined in Sec. 207.

(3) Woven Wire and Brace Wire

Woven wire and brace wire for fence shall be sampled by selecting one roll from each lot of 50 rolls of fencing, or fraction thereof, in a shipment. A sample shall consist of a 2 ft. (0.6 m) length

of the woven fence, full width, or one 2 ft. (0.6 m) strand of brace wire, and shall be cut from the end of the roll. This includes woven wire and brace wire used in farm fence, except as noted below. Rods, fittings, and gates, as outlined in Paragraph (b)(1) above, and farm fence to replace old, or damaged fence to be reset, require no testing, and may be accepted on modified inspection, as outlined in Sec. 207.

(c) Miscellaneous Fencing

(1) Snow Fence

One sample shall be taken from one roll in each 100 rolls in a shipment. The sample shall be 2 ft. (0.6 m) in length and the full width of the fence, and shall be cut from the end of the roll that includes the 12 in. (300 mm) length of untwisted wire required for testing purposes.

(2) Wood, Treated

Samples of wood fencing normally are not taken on the project. Usually the preservative, penetration, and retention will be approved at the point of treatment. See Secs. 204.29 and 204.33.

(d) Posts

See Sec. 204.28 for sampling requirements of fence posts.

(e) Shipping Samples of Fencing

Samples of fencing shall be rolled into a tight roll and tied securely. However, care shall be exercised not to bend or kink the wires of the fencing. When shipping snow fence, projecting wire shall be turned inwardly before rolling. Woven wire may be folded and placed between 2 pieces of cardboard. The samples shall be marked and shipped to the Central Office Laboratory, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(f) Reports

Laboratory tests and inspections of fencing will be reported on Forms TL-47 and TL-109 respectively, as outlined in Sec. 800.

Sec. 204.17 Fly Ash

(Sec 241) Fly Ash may be accepted in any job by means of a letter from the Fly Ash Marketing Company certifying it meets specification requirements, as outlined herein, and in the Road and Bridge Specifications.

Class "F" Fly Ash will be approved based on its conformance to the requirements of ASTM C618.

Class "C" Fly Ash will be considered for approval only when the producer submits independent ASTM C441 test data to support the replacement level of fly ash needed to remediate Alkali Silica Reactivity (ASR). The replacement amount must be sufficient as to limit expansion to less than 0.1% (when normalized) with an alkali content of the cement at least equal to the maximum alkali expected to be encountered. This data will be reviewed by the State Materials Engineer and verified by testing before final approval is granted.

The Fly Ash Company will assure the Department of its quality control program by stating in detail its frequency of sampling and testing and other production control. Any changes shall be reported immediately to the State Materials Engineer.

In addition, the Fly Ash Company will furnish the State Materials Engineer a certification letter annually. This letter will contain wording similar to the following:

"Company Letterhead

_____ Project Number _____

Date

Dear Sir:

The fly ash to be furnished during 19__ will be produced at _____(power plant) . We certify it will be monitored under our normal quality controlled processes and will, based on our test results, meet the requirements of Type _____ Fly Ash according to Virginia Department of Transportation's Specifications."

This letter is to be signed by a responsible company official and should be mailed about mid-December each year. Distribution of this certification letter will be made immediately by the State Materials Engineer to the District Materials Engineer.

The Fly Ash Plant will maintain a file of the test results for Fineness, Loss on Ignition, Moisture Content and Specific Gravity on each 400 ton (400 metric ton) lot from which shipments will be made. The Plant will furnish a complete chemical and physical test report on a composite sample representing each 2000 tons (2000 metric ton). This composite sample will be prepared by combining equal parts of five consecutive samples representing the 400 ton (400 metric ton) lots. Lot numbers should be designated in such a manner that the lot can be identified with the date shipped. It will be satisfactory to submit the lab report after the 28 day test results are complete. IT IS NOT DESIRED TO RELATE THIS REPORT WITH A PARTICULAR PROJECT.

Upon shipment of fly ash to a project, the Plant will enter on the delivery tickets the date, lot number, and truck or rail car number. The lot number used will be that of the Plant and not one of an intermediate terminal.

Sec. 204.18 Guardrail, Steel Beam

(Sec. 221) See Sec. 207 for additional details of modified acceptance. Steel beam guardrail will be accepted on the basis of modified inspection. This also includes associated hardware; such as, offset blocks, terminal sections, and fixed object attachments, among others. (For requirements for accepting guardrail posts, see Sec. 204.28).

The guardrail Supplier or Erector shall file with the State Materials Engineer an annual certificate of compliance and guarantee on July 1, of each year, similar to the one below. Any additions to the list will require submittal of an updated certificate. Certificates will be kept on file in the Central Office Laboratory Structures Section. The suggested certificate is as follows:

SUPPLIER'S OR ERECTOR'S LETTERHEAD

CERTIFICATE OF COMPLIANCE AND GUARANTEE

We, __ (Name of Erector) ____, State of _____, certify that guardrail material to be erected on Virginia's highway construction projects and guardrail material to be supplied for Virginia's maintenance orders will conform to the requirements of the specifications as noted in the Road and Bridge Specifications. It is further certified that all of our material Suppliers will be required to furnish us mill analyses and/or certifications for each shipment of material ordered. These documents will be on file and will be available to the Virginia Department of Transportation upon request.

The following is a list of Manufacturers and Suppliers which will be furnishing to our organization guardrail material and associated hardware:

1. (Name of supplier and address)
- 2.
- 3.
- 4.
- 5.
- 6.

Any additions to the above will require submittal of an updated certificate of compliance and guarantee. A new certificate of compliance and guarantee will be submitted to the State Materials Engineer on an annual basis on July 1, of each year.

We will replace, without cost to the Department, any guardrail material that is not in conformity with the specifications.

State of _____ Erector's Name

County of _____

It will be necessary that District personnel obtain check samples consisting of a minimum of 2 linear ft. (0.6 m) of beam (no bolts, nuts, nor washers), selected once each 6 months per construction District, and submit to the Central Office Laboratory for testing. This sample normally is taken at the project.

All samples of guardrail shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Laboratory tests and inspections of guardrail beam will be reported on Forms TL-25 and TL-109 respectively, as outlined in Sec. 800.

Sec. 204.19 Joint Materials

(Sec. 212) See Sec. 207 for joint materials that may be accepted on modified inspection. Joint fillers, joint sealers, and pipe gaskets shall be sampled as follows:

(a) Elastomeric Expansion Dam

Elastomeric expansion dam shall be accepted by the submission of certified materials test results from a qualified independent testing laboratory and a certification from the Manufacturer that the material meets or exceeds the applicable specification.

Structural steel, aluminum, and anchor bolts used in expansion dams will be accepted on mill analyses, as outlined elsewhere herein.

(b) Expanded Rubber Joint Filler

Expanded rubber joint filler shall be sampled by obtaining one sq.ft. (0.09 m²) of each thickness and for each lot or shipment received. Samples shall be submitted to the Central Office Laboratory either loose or in a packaging envelope.

Samples shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(c) Hot-Poured Joint Sealer

This shall be sampled by cutting one piece, of about 10 lbs. (5 kg), from the original container. One sample shall be taken from each shipment or lot. In no case shall a sample be taken from the heating kettle. The sample may be wrapped in paper and shipped, without boxing, to the Central Office Laboratory for tests. In the Laboratory, test specimens are cut from the inner portion, whether surface contamination is apparent or not. Wrapping paper adhering to the sample is, therefore, not objectionable.

Each sample shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(d) Poly(Vinyl Chloride) (PVC) and Polyethylene Joint Fillers

These shall be sampled by obtaining one section of full thickness not less than 2 ft. (0.6 m) long and the full depth of the joint from each consignment of 1000 sq.ft. (100 m²) or less. At least one sample shall be taken for each thickness of joint and one for each type or brand. These samples shall be enclosed in a box or securely tied to a piece of board, so that they may be transported without damage. Nails must not be used to fasten the sample to the board. Samples shall be submitted to the Central Office Laboratory for tests.

All samples shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(e) Preformed Chloroprene Seal

This shall be sampled, packed, marked, and shipped, in accordance with Paragraph (b) above.

(f) Preformed Elastomeric Joint Sealer

One sample of preformed elastomeric joint sealer shall be obtained for each thickness or size and for each lot or shipment received, and submitted to the Central Office Laboratory for tests. The size of sample should be 2 lin. ft. (0.6 m) of each thickness or size. No shipping container is necessary.

The lubricant adhesive to be used with the seal shall be accepted on certification from the manufacturer that it conforms to the requirements of ASTM D4070.

All samples shall be marked, in accordance with Section 203, using Form TL-10, as outlined in Sec. 800.

(g) Preformed Joint Filler (Bituminous Types)

Visual Inspection.

(h) Pressure Joint Relief Material

This shall be sampled by obtaining one piece one ft. (300 mm) in length for each size per lot. The sample shall be submitted to the Central Office Laboratory for tests. No special packaging is required.

Samples shall be marked, in accordance with Section 203, using Form TL-10, as outlined in Sec. 800.

(i) Pipe Gaskets

Rubber and plastic gaskets for pipe shall be sampled by obtaining 2 complete gaskets for each shipment or lot received. The sample shall be submitted to the Central Office Laboratory for tests. No shipping container is necessary. See Sec. 204.26 (n) herein for instructions on approval of pipe gaskets for use in municipal sewer and water lines.

Samples shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(j) Sponge Rubber Joint Filler

This shall be sampled, packed, marked, and shipped, in accordance with Paragraph (d) above. When used in conjunction with bridge bearings, samples shall also be obtained and tested in the same manner as outlined above.

(k) Waterstops

Elastomeric waterstops of chloroprene or poly(vinyl chloride) shall be sampled by obtaining one piece one ft. (300 mm) in length for each size per lot. Samples shall be submitted to the Central Office Laboratory for tests. No special packaging is required.

Samples shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

Metal waterstops consisting of sheet copper will be accepted on modified inspection, with no testing or certification required, as outlined in Sec. 204.12.

(l) Silicone

Silicone joint material will be accepted on the basis of a list distributed by the Materials Division, and only visual inspection is required at the job site.

(m) Reports

Laboratory tests and inspections of joint materials will be reported on Forms TL-23 (expanded rubber, poly(vinyl chloride) and polyethylene, preformed chloroprene, preformed elastomeric, pressure joint relief material, pipe gaskets, and waterstops), TL-47 (hot-poured, preformed (bituminous), sponge rubber, and preformed elastomeric lubricant- adhesive), and TL-109 respectively, as outlined in Sec. 800.

Sec. 204.20 Landscape Materials (Roadside Development)

(Sec. 244) See Sec. 207 for additional details of acceptance of landscape materials by modified inspection.

(a) Fertilizer

Fertilizer will be accepted on visual inspection, in accordance with Sec. 244.02 of the Road and Bridge Specifications with approval of the Environmental Quality Division.

(b) Herbicides

Herbicides are to be visually inspected to determine that the Manufacturer's container is labeled as required. The label should include the herbicide composition, brand, and name and address of the Manufacturer. Questionable sources will be checked to determine that the material is registered with the Department of Agriculture and Consumer Services.

(c) Lime

Acceptance of lime will be handled, as outlined in Sec. 204.21 (a).

(d) Mulch, Wood Cellulose Fiber, for Hydraulic Seeding

Fiber mulch approval is based upon a semiannual source/inventory sampling program conducted prior to shipment. Material (sources) meeting specification requirements will be listed on approved lists

published periodically. (See Sec. 209 for current approved list.) Visual inspection is all that is required at the point of delivery.

For approval purposes, 3 samples selected randomly will be taken from each source by a designated representative of the Department and submitted to the Central Soils Laboratory. The average results of these test samples will be the basis for determining compliance with VDOT specifications. If in compliance, the source will be placed on the approved list. If the material is found to be unacceptable, the source will be notified by letter that their product is being removed from the approved list. To be reinstated, the Producer either must furnish a product conforming to his/her stated guarantee or adjust the stated guarantee of the dry weight per bag, if this is the deficiency. If the deficiency is in the physical properties of the mulch, conformance and approval shall be determined by additional random samples obtained by a Department representative. Of course, the Producer has the option to remain off the list and request to be included in the next semiannual check.

Any additional testing of approved, but questionable, mulch from shipments received at the point of delivery is at the option of the Engineer; however, when tests are run, the moisture/dry weight of the shipment used for price or application adjustments shall be based on a sufficient number of random samples (average of at least 3). If the District Materials Engineer does perform this additional testing, the test results shall be reported to the District Environmental Coordinator or Specialist.

(e) Seed and Sod

Seed and Sod will be accepted on visual inspection, in accordance with Sec. 244.02 of the Road and Bridge Specifications with approval of the Environmental Quality Division.

(f) Filter Cloth Fabric - Geotextiles

Each lot of filter cloth fabric shall be sampled at the source and the sample submitted to the Central Office Laboratory for testing. If there is no evidence of test when the material arrives at the project, it shall be sampled at the project.

In addition, the Manufacturer or Supplier shall certify only that the material contains ultraviolet ray inhibitors and stabilizers, since this test would take too long to determine. Also the Manufacturer shall certify the burst strength of the material being furnished, where applicable. This certification should be presented to the industrial inspector before sampling and testing of the material for approval. The industrial inspector will maintain the documentation and will not place state seals, stamps, or decals on materials that do not have the appropriate documentation.

A visual inspection should be made of the stockpile to see that the fabric is uniform in composition, packaging and free of obvious defects resulting from shipment or storage. All rolls should have roll and style numbers as identifiers.

The fabric producer or provider (consignee) should have a shipping document containing all roll numbers for the materials being evaluated. A copy of this shipping document and manufacturers certifications regarding ultraviolet ray inhibitors, stabilizers, and or burst strength should be given to the industrial inspector and a lot number assigned to this grouping of rolls. The inspector should label these shipping document sheets with the assigned lot numbers and retain them as part of his permanent documentation. A sample of the fabric, at least 10 linear feet (5 meters) and full width of the roll is then taken at random by the inspector. Pertinent information on the fabric is then recorded on a TL-10 and is submitted with the sample to the Central Office Materials Division for testing.

Lot size shall be no greater than 250,000 square feet (25,000 square meters) per sample. Two or more samples should be taken if quantity of material exceeds this criteria as outlined and a separate TL-10 written for each sample.

Acceptable lots of material shall be sealed, stamped, or decal labeled by the industrial inspector.

Failing lots of material may be retested once, if requested by the supplier. Sampling for retests should be done in accordance with ASTM D4354. (The number of rolls to be sampled and tested shall be the cube root of the total number of rolls in the lot.)

The industrial inspector shall notify suppliers of failing lots. The suppliers shall then be required to remove that material from consideration for use on state projects or state purchases.

The Industrial Inspector shall issue a TL-109 when geotextiles are being shipped to state projects. The inspector shall issue a Physical Release when geotextiles are sold or transferred to subconsignees or other providers contracting to the state. To facilitate this documentation, the distributor should notify the industrial inspector of shipment of material to other distributors in regions of the state where the material may ultimately be purchased by the Department.

No material shall be used on a state project if the material does not carry the state seal, stamp, or a decal of approval. The industrial inspector shall be contacted in the event that there is no evidence of testing and approval.

No special packaging is required. Samples shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Length and width measurements as well as lot number, manufacturer, brand name and style shall be shown on the TL-10. Laboratory tests of filter cloth fabric will be reported on Form TL-47, as outlined in Sec. 800.

Sec. 204.21 Lime

(Sec. 240) See Sec. 207 for acceptance of lime on modified inspection.

(a) Agricultural

(Sec. 244.02) Agricultural grade ground limestone shall be approved for use as follows. The Environmental Quality Division will periodically provide a list that will be forwarded to the District Materials Engineer, showing the results of laboratory tests of agricultural lime from sources supplying Virginia. (See Sec. 209.) The District Materials Engineer should compare the source of materials list for each applicable project with the Department of Agriculture list, to see that lime from the proposed project source meets the requirement for calcium carbonate equivalent (not less than 85 percent).

Where doubt exists about the carbonate content or in cases of lime received from sources not on the Agriculture Department list, a sample should be obtained and submitted to the Central Office Chemistry Laboratory.

It should be noted on the Department of Agriculture lists that there may be lime sources listed that do not meet specification requirements, with regard to calcium carbonate equivalent.

(b) Hydrated

Hydrated lime may be accepted on visual inspection, based on receipt of Manufacturer's certification by the Materials Division, as outlined in Sec. 207.

However, if the lime is from a new source, it will be necessary to secure a sample of approximately one qt. (one L) in size for testing. This sample will normally be taken at the point of delivery. Care must be exercised to see that a representative sample is obtained completely free from any contamination. The sample shall be submitted to the Central Office Laboratory in a closed, airtight

container, usually a metal container or mason jar, and shall be marked in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(c) Hydraulic

This shall be approved for use, as outlined in Paragraph (b) above.

(d) Reports

Laboratory tests and inspections of lime, when conducted, will be reported on Forms TL-47 and TL-109 respectively, as outlined in Sec. 800.

Sec. 204.22 Masonry Units, Concrete

(Secs. 222 (a)(1), (a)(2), (a)(3), and (b)) Concrete masonry units normally shall be sampled by the Department's representative assigned to the particular plant making shipment. These samples are to be taken at the source of manufacture, if possible, prior to shipment to a project in order that the Materials Division can issue a test report prior to the use of the masonry units in the construction.

(a) Wall Units

Masonry wall units, consisting of hollow load bearing units, hollow non-load bearing units, or solid load bearing units shall be sampled, as outlined herein. A sample shall consist of 10 whole units for lots of 10,000 units, or fraction thereof. For lots of 10,000 to 100,000 units, a sample shall consist of 20 whole units. For lots of more than 100,000 units, 10 whole units shall be sampled from each 50,000 units, or fraction thereof. When the shipment consists of block of various different sizes, only the one minimum rate of sampling specified above will apply, and it will not be necessary to duplicate the size of sample for each size of block in the shipment. The samples shall be shipped to the District or Central Office Laboratory for testing. No container is necessary for shipment of the sample.

The samples shall be marked and shipped, in accordance with Sec. 203, using Form TL-10, as outlined in Sec 800.

(b) Catch Basins and Manholes

(For sampling of brick used in catch basins and manholes conforming to AASHTO M91, Grade MS or ASTM C55, Grade N-I, see Sec. 204.07.) Masonry units used in catch basins and manholes shall be sampled, marked, and shipped to the Laboratory for tests, as outlined in Paragraph (a) above.

However, care must be exercised in selecting units submitted for tests. At least 1/2 of the number of units submitted in a sample MUST BE BARREL BLOCKS. The shape of batter blocks prevents conducting a proper compression test on these particular units. However, batter blocks can be used for absorption tests.

(c) Miscellaneous Precast Units

Precast concrete manholes, box culverts, and other precast concrete products (excluding concrete pipe, and prestressed concrete), conforming to the applicable VDOT specifications or special designs approved by VDOT will be accepted on the manufactures certification based on the requirements of the VDOT Precast Concrete Products Quality Assurance Program as outlined below.

The following classifications of miscellaneous precast products, such as: 1) Manholes, 2) Box Culvert Systems, 3) Drainage Structures, 4) Barriers, 5) Retaining Walls, 6) Soundwalls, , and 7) R/W monuments, 8) other Precast Concrete Products upon approval by VDOT, may be accepted on the

manufacturers certification based on the requirements of the VDOT Precast Concrete Products Quality Assurance Program as outlined below. (Temporary precast traffic barrier service shall be visually accepted at the project site for cleanliness, structural integrity, and functionality).

(1) Testing

The producer will submit for VDOT approval a Quality Control Plan and perform the following minimum quality control procedures, and the statement "We certify that these items have been tested and conform to the VDOT Precast Concrete Products Quality Assurance Program" shall be on each shipping document and signed by a responsible company representative. The shipping document should also contain the following information: The plant name, location, telephone number, document number, contractors name, and project number. One additional copy of the shipping document shall be provided to the monitoring District Materials Section for distribution to the receiving District.

Test	Minimum Frequency
a) Compressive strength Two 6"x12" (150 x 300 mm) or Three 4"x8" (100 x 200 mm) cylinders or One 4" (100 mm) core (if max. aggr. size 1/2" (12.5 mm) two 4"x8" (100 x 200 mm) cyls. may be used)	One per lot
b) Absorption (Dry Cast only)	One per lot
c) Inspection of manufactured product for visual defects	Each unit
d) Air Content - one test per lot (wet cast only) one test per day for Box Culverts, Retaining Walls, or other precast structural products	
e) Soundwall structural concrete – temperature, air, slump from same concrete as control cylinders are made	
f) Soundwall panel – sound absorptive material one unit weight per lot	

For the purpose of this program, a lot is defined as a maximum of 250 cubic yards (200 cubic meters) or as a single weeks production (whichever is less) of precast concrete from each batching operation, being of like material, strength and manufactured by the same process. The exception being soundwall panels, where a lot will be considered one day of production. Variations in lot definition will be governed by applicable specifications and approved by the Engineer.

If cylinder strength failure occurs, the lot may be evaluated by cores. If a core fails, two cores may be taken to recheck the failed core. Both cores must pass for the lot represented to be acceptable. If both cores do not pass, each unit may be tested individually for acceptance.

(2) Test facilities

Producer facilities, equipment and testing personnel will be adequate to conduct the applicable tests outlined in AASHTO T280, and will be approved by the Department. Quality Control procedures shall be performed by or under the direction of a VDOT certified Hydraulic Cement Concrete Plant and Field Technician.

Entrained air will be checked with a pressure type meter according to AASHTO T - 152.

Compression cylinders or cores will be tested with facilities, equipment and personnel sufficient to conduct such tests according to AASHTO T22. Compressive strength cylinders may be either 6 inch

(150 mm) diameter by 12 inch length (300 mm), or 4 inch (100 mm) diameter by 8 inch (200 mm) length.

Producers will maintain current calibration certificates on all analytical equipment used in testing.

Producers may elect to use the services of an independent commercial testing laboratory acceptable to the Department in lieu of conducting their own tests.

(3) Shipment

Products may be shipped to VDOT projects under either of the two following conditions:

- a) All required testing for all product in the lot has been completed with acceptable results and all of the product to be shipped is at least the age of the test specimens at the time of testing. Acceptable results for shipping are defined as 85% of design compressive strength. Strength testing shall continue until design compressive strength has been attained.
- b) Product which otherwise has met all test criteria may be shipped prior to completion of absorption testing if the concrete mix and manufacturing process used have historically produced the required absorption results, and approval is received from the Engineer, with final acceptance pending acceptable results.

(4) Records

All testing and inspection documentation will be maintained at the producing plant for at least five years, and will be made available to Department personnel at their request.

Producers will also collect and maintain conformance certificates and/or mill test reports for aggregates, cement, and reinforcing steel, frames, grates, collars, lids, steps, steel angles, and other applicable components intended for use in products to be used on VDOT projects.

Producers will maintain a Department approved Quality Control Form(s) for each lot, and as a minimum the form(s) will contain the following:

- Plant identification
- QC Technician Signature
- Lot identification
- Production dates
- Number of units and cubic yards (cubic meters) produced for each lot.
- Reinforcement as per specification or approved drawings
- Compressive strength
 - cylinder strength - required/achieved
 - core strength - required/achieved
- Absorption - required/achieved
- Visual inspection performed
- Markings verified
- Dimensions verified: Applicable Specifications
 - Manholes AASHTO M199 (ASTM C478)
 - Box Culverts AASHTO M259 (ASTM C789)
 - AASHTO M273 (ASTM C850)
 - Water and Wastewater (ASTM C913)
 - Structures (i.e. DI's, JB's,
 - EW's, etc.)
- Raw materials

current certifications from vendors
Repair materials - VDOT approved list

In addition to date and other required markings, the plant identification and letters QC shall be affixed to each piece of product. Such marking shall be evidence that the required QC procedures have been performed.

(5) Monitoring

The producers production and testing facilities, processes, records, and product will be monitored weekly, as a minimum, by the Department. Checklist of items to be inspected Appendix II-F. (Precast Concrete Plant Monitor Report) The checklist must be completed in its entirety each quarter. The weekly monitoring effort should emphasize inspection of one or two of the items on the list. Shipment of samples to the District or Central Office laboratory for testing shall be in accordance with Sec. 203, using Form TL-10 or Form TL-13, as outlined in Sec. 800.

(6) Annual Quality Testing

Annual Quality testing will be performed by the Department for establishing quality of raw materials. The tests will be performed on the aggregates, cement, mineral admixtures, and all types and sizes of reinforcing materials.

(7) Repairs

Edge and corner spalls are to be repaired to their original neat lines. Mortar used in the repair work shall be from the approved list and the color for exposed units is to be selected/made to closely match the color of the concrete in the unit. Patching materials are to be applied in accordance with the manufacturer's recommendations.

Cracks of less than 12 inches (300 mm) in length and less than 0.01 inch (0.25 mm) in width may be repaired with mortar, except soundwall will be repaired in accordance with current specifications. Generally speaking, units with large cracks are not to be used. Units having full depth cracks are not to be used.

When the effectiveness of a connection is reduced but involves damage to less than 20% of the longitudinal dimension of that connection, repair may be performed as in paragraph above. When damage to the tongue or groove involves 20% or more of the longitudinal dimension, the repair must be doweled into the undamaged portion of the unit and performed using hydraulic cement concrete, cured in accordance with the provisions of Section 404 of the specifications. Note: The rejection criteria for length and width of cracks is taken from AASHTO M199. The 20% criteria for keyways is a collective judgement.

(7a) Repairs to Used Barriers

Delineators and other required reflective materials are to be replaced with new material and the marks/blemishes caused by the removal are to be repaired or acceptably covered.

Used barrier sections should not be expected to look like new. They should be cleaned/coated sufficient to afford good visibility and uniformity of appearance. The barrier sections must be structurally sound with no concrete missing along the top surface, and no through cracks.

Sec. 204.23 Monuments, Right-of-Way

(Sec. 219 and Road Designs and Standards, RM-2) See Sec. 207 for details of acceptance on modified inspection. Concrete right-of-way monuments are inspected and stamped at the plant when

practicable. When monuments are received on the job bearing no inspection mark, or when monuments are made on the job by the Contractor, one whole monument shall be submitted to the District or Central Office Laboratory from each project. No container is necessary for shipment, but all required information should be recorded for the monument.

When RM-2 monuments are used, consisting of steel pins and either U-type galvanized rolled rail steel or aluminum alloy locator posts, it will be necessary to secure a sample of one whole cadmium plated brass or stainless steel cap used therewith per project and submit it to the Central Office Laboratory for test. The sample may be shipped in a packaging envelope. Samples of the pins and posts will not be necessary and they may be accepted on visual inspection, since no tests or certification are required.

Each sample shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Laboratory tests and inspections of concrete monuments will be reported on Forms TL-29 and TL-109 respectively, as outlined in Sec. 800. Laboratory tests of brass or stainless steel caps will be reported on Form TL-47, as outlined in Sec. 800.

Sec. 204.24 Paint

(Sec. 231) Paint shall be mixed thoroughly by stirring or by agitating before the sample is selected. The mixing may be accomplished by mechanical agitation, stirring with a paddle, or by "boxing" the paint. In "boxing" the paint, a clean container is used, and the paint is poured back and forth between the containers until all lumps are broken up and thoroughly dispersed through the paint. Care must be taken to incorporate in the paint all settled pigment from the bottom of the container. At least one quart (one liter) of paint, System A, and AA of each type used (aluminum paste and varnish sampled separately) shall be submitted to the Central Office Laboratory for examination from each lot or batch. Paint, Systems B and F, will be accepted on approved list, and certification. Clean, widemouth metal cans may be used for shipment.

All samples of paint shall be packed and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Laboratory tests and inspections of paint will be reported on Forms TL-47 or TL-47A and TL-109 respectively, as outlined in Sec. 800.

Paint in quantities of 20 gals. (75 liters) or less per project may be accepted on modified inspection, as outlined in Sec. 207.

Sec. 204.25 Piling

(Secs. 217, 226(b), 228, and 236) See Sec. 207 for piling that may be accepted on modified inspection.

(a) Concrete: Cast-In-Place, Precast, or Prestressed

Sampling of cast-in-place, precast, or prestressed concrete piling shall be in accordance with Sec. 400.

(b) Steel, H-Beam

Steel H-beam piling will not require sampling and or mill inspection. It is the responsibility of the Contractor to request 3 copies of the mill analysis, and a packing list showing the number of piles of each length and heat numbers, when placing the order for this material to be delivered directly to the project site. The 3 copies of the mill analysis shall accompany the shipment to the project. The Project Inspector shall compare the heat number on the piles to that stated in the mill analysis, to ensure that the piles are in fact the material represented by the mill analysis. Caution should be

exercised to ensure that a mill analysis is present for each heat represented, since many times a shipment will contain several heats. A copy of the packing list shall be transmitted with 3 copies of the mill analysis to the State Materials Engineer by the Project Inspector. See Sec. 207 for additional details on modified inspection.

(c) Steel, Sheet

Steel sheet piling shall be approved by mill analysis and packing list, as outlined in Paragraph (b) above.

(d) Steel, Shell

Type A and D steel pile shells shall be approved by mill analysis and packing list, as outlined in Paragraph (b) above.

(e) Timber

Timber piles will not require sampling, but will require shop inspection. For treated piles, the preservative and treatment are sampled, as outlined in Secs. 204.29 and 204.33. Untreated timber piles may be accepted on modified inspection, in accordance with Sec. 207.

(f) Reports

Laboratory tests of concrete cylinders for concrete piling will be reported on Form TL-26 (TL-26B, if computerized test report output form). Laboratory tests of preservative treatments for treated timber piling will be reported on Form TL-47. Inspections of prestressed concrete and treated piling will be reported on Form TL-109. See Sec. 800 for details of these forms.

Sec. 204.26 Pipe

(Sec. 232) See Sec. 207 for additional details of acceptance of pipe by modified inspection. (See list of gaskets and coatings in Sec. 209.) When the quantity of any approved type of culvert pipe is 50 ft. (15 m) or less per project, culvert may be accepted on visual inspection. Culvert pipe used on rest area and landscape contracts will be sampled and tested the same as for any other type project.

(a) Acrylonitrile-Butadiene-Styrene (ABS)

ABS semiround underdrain pipe with top shield shall be sampled by cutting one piece a minimum of 2 ft. (0.6 m) in length by full section from one pipe length of each size per shipment. See Paragraph (n) herein for instructions on approval of ABS pipe used in municipal sewer lines.

All samples shall be submitted to the Central Office Laboratory loose, with Form TL-10 attached. The samples shall be marked and shipped, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(b) Cast Iron

Cast iron culvert pipe may be accepted on modified inspection, based on Manufacturer's certification, as outlined in Sec. 207. See Paragraph (n) herein for instructions on approval of cast iron and ductile iron pipe, fittings, and gaskets for use in municipal sewer and water lines.

(c) Clay

Clay pipe shall be sampled by selecting the equivalent of 0.5 percent of the total number of pipes of each size produced each day, with at least one specimen of each size being furnished. Samples for strength tests shall consist of one complete pipe joint. Samples for absorption tests shall consist of a

full thickness section cut from the wall of the pipe, and measuring 12 to 20 sq.in. (7,500 to 15,000 mm²) in surface area.

The strength tests will usually be performed at the plant, especially for the larger size pipes. Absorption samples are submitted to the District or Central Office Laboratory, and shall be taken from the same pipe specimens that have been found acceptable in strength requirements. The samples shall be packed and marked, in accordance with Paragraph (a) above.

See Paragraph (n) herein for instructions on approval of vitrified clay pipe and fittings for use in municipal sewer lines.

(f) Concrete

Concrete pipe, conforming to the applicable VDOT Specifications, will be accepted on the manufacturer's certification based on the requirements of the VDOT Concrete Pipe Quality Assurance Program as outlined below. This involves the sampling, testing, documentation and certification of the product by the manufacturer in combination with a Department monitoring program. VDOT reserves the right to discontinue acceptance of concrete pipe in the event that VDOT monitoring efforts indicate that non-specification material is being provided or test procedures are not being followed.

The following types of pipe may be accepted under this program: (1) Concrete Sewer, Storm Drain and Culvert Pipe; (2) Reinforced Concrete Culvert, Storm Drain and Sewer Pipe; (3) Joints for Circular Concrete Sewer and Culvert Pipe using Rubber Gaskets; (4) Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe; and (5) Reinforced D-Load Culvert, Storm Drain, and Sewer Pipe.

(1) Frequency of Testing

The producer will perform the following minimum quality control procedures, and the statement "We certify that these materials have been tested and conform to the VDOT Concrete Pipe Quality Assurance Program." shall be on each shipping document and signed by a responsible company representative.

Test	Minimum Frequency
a Plant load bearing tests or Compressive strength	One per lot
b Absorption	One per lot
c Inspection of manufactured product for visual defects and imperfections.	Each unit

For the purpose of this program, a lot is defined as a single days production of concrete pipe, all being of like size, material, strength designation, and manufactured by the same process. However, if less than 100 units are produced per day, the lot size may include up to 100 units produced in no more than 5 days. The five days need not be consecutive, as long as they occur within a two week period, and the process used is not altered in any way between production days.

If a manufacturing process is used which produces two or more pipe sizes, styles, or classes simultaneously, one set of material tests (compression and absorption) can be used to represent all sizes, styles, or classes, provided no change in mix design occurs. Individual load bearing tests, if

used as a basis of acceptance, will be required for each size, style or class, according to the guidelines described above.

(2) Test Facilities

Producer facilities, equipment and testing personnel will be adequate to conduct the tests outlined in AASHTO T280, and will be approved by the Department. . Quality Control Procedures shall be performed under the direction of a VDOT certified Hydraulic Cement Concrete Plant and Field Technician.

If compression cylinders or cores are used in lieu of three edge bearing tests, facilities, equipment and personnel will be sufficient to conduct such tests according to AASHTO T22. Compression cylinders may be either 6 inch (150 mm) diameter by 12 inch (300 mm) length, or 4 inch (100 mm) diameter by 8 inch (200 mm) length.

Producers will maintain current calibration certificates on all analytical equipment used in testing.

Producers may elect to use the services of an independent commercial testing laboratory acceptable to the Department in lieu of conducting their own tests.

(3) Shipment

Products may be shipped to VDOT projects under either of the two following conditions:

- (a) All required testing for all product in the lot has been completed with acceptable results and all of the product to be shipped is at least the age of the test specimens at the time of testing.
- (b) Product which otherwise has met all test criteria may be shipped prior to completion of absorption testing if the concrete mix and manufacturing process used have historically produced the required absorption results, and approval is received from the Engineer, with final acceptance pending acceptable results.

(4) Records

All testing and inspection documentation will be maintained at the producing plant for at least two years, and will be made available to Department personnel at their request.

Producers will also collect and maintain conformance certificates and/or mill test reports for aggregates, cement, and reinforcing steel intended for use in products to be used on VDOT projects.

Producers will maintain a Department approved Quality Control Form for all pipe produced for VDOT projects. As a minimum, a form for each lot will contain the following:

Plant identification	Technician Signature
Lot identification	Production dates
Pipe dimensions	Pipe strength class
diameter - required/achieved	Number of units produced each date
length of pipe - required/achieved	Visual inspection
wall thickness - required/achieved	finish/cosmetic
joint style - required/achieved	dimensional tolerances
Reinforcement	wall thickness
style and spacing - required/achieved	diameter
area - required/achieved	length
position of reinforcement - required/achieved	position of reinforcement
adequacy and quality of welds/splices	markings

Compressive strength	Raw materials
cylinder strength - required/achieved	current certifications from vendors
core strength - required/achieved	Absorption - required/achieved
Three Edge Bearing	
0.01" (0.03 mm) crack strength - required/achieved	
ultimate strength - required/achieved	

The plant identification and letters Q.C. shall be affixed to each piece of pipe and end section. Such marking shall be evidence that the required Q.C. procedures have been performed.

(5) Monitoring

The producers production and testing facilities, processes, records, and product will be monitored weekly, by the Department. Checklist of items to be inspected is included as appendix II-B. The checklist must be completed in its entirety each quarter. The weekly monitoring effort should be confined to inspection of one or two of the items on the list. One size and class of pipe should be selected for three-edged bearing test per month, the sample should be taken at random, the test witnessed for load test compliance, and noted on the monitoring checklist, size, load, crack width, etc. The pipe should not be taken to ultimate, if it passes the D-Crack Load.

(g) Corrugated Metal Pipe

Corrugated metal pipe conforming to the applicable VDOT specifications will be accepted on the manufacturer's certification based on the requirements of the VDOT Corrugated Metal Pipe Quality Assurance Program as outlined in paragraph (h). This involves the sampling, testing, documentation, and certification of the product by the manufacturer in combination with a Department monitoring program. VDOT reserves the right to discontinue acceptance of metal pipe in the event that VDOT monitoring efforts indicate that non-specification material is being provided or test procedures are not being followed.

The following types of steel and aluminum alloy pipe may be accepted under this program.

- (1) Corrugated metal culvert pipe, pipe arches, and underdrains
- (2) Asphalt coated corrugated metal culvert pipe and pipe arches
- (3) Corrugated metal end sections and coupling bands

Coatings:	(1) Zinc coated (galvanized)
	(2) Precoated (polymeric) galvanized
	(3) Aluminum-Zinc alloy coated
	(4) Aluminum Coated

(h) VDOT Corrugated Metal Pipe Quality Assurance Program

The manufacturer will perform the following minimum quality control procedures, and the statement "We certify that these materials have been tested and conform to the VDOT Corrugated Metal Pipe Quality Assurance Program" shall be on each shipping document, and signed by a responsible company representative. Records of the following test and inspection procedures will be accessible to VDOT and retained for two years.

Frequency

- | | |
|-----------------------------------------------------------|-----------|
| (1) Maintain file of metal sheet manufacturer's certified | Each heat |
|-----------------------------------------------------------|-----------|

	mill analysis	
(2)	Sheet or Coil Thickness Measurement	One per heat
(3)	Coating Thickness Measurement on Sheet or Coil	One per heat
(4)	Pipe dimension:	One per production
	Diameter - Measurement	shift, per spiral
	Corrugation Depth - Measurement	machine, metal,
	Corrugation Width - Measurement	or corrugated depth
	Seams locked and welded - Visual	
(5)	Lock seam test - AASHTO T249	One test per spiral
	Welded seam test - AASHTO T241	machine, per shift, per
		week
(6)	Repair of damaged metallic coating, surface cleaning,	Once per day if
	thickness - Visual	applicable
(7)	Underdrain:	Once per day
	Size of perforation - Measurements	
	Rows of perforations - Visual	
	Slotted Drain:	
	Slot Height - Measurements	
	Slot Width - Measurements	
	Bar Thickness - Measurements	
(8)	Asphalt Coated Product:	Ten Percent of
	Coating thickness - Measurement	Production
	Pavement thickness - Measurement	
	Pavement width - Measurement	
(9)	Arch dimensions - Measurement	Ten Percent of
		Production
(10)	Rivet details	
	Spacing - Measurement	
	Diameter - Measurement	
(11)	Workmanship - Visual	One Hundred Percent

The plant identification and the letters "Q.C." shall be affixed to each piece of pipe and end section. Such marking shall be evidence that the required Q.C. procedures have been performed.

To determine the weight of galvanized coating, thickness may be obtained by means of a magnetic thickness gauge. Four (4) separate readings (2 outside and 2 inside) shall be randomly taken. The outside and inside reading will be added and the average of the two additions must not fall below 3.4 mils (85 μm). Thickness measurements are to be converted to weight per square foot (square meter). The average weight of zinc in ounces (grams) per square foot (square meter) as measured will be noted on the inspection report.

Samples may be requested by VDOT for testing of galvanized coating. These samples should be 3 by 6 inch (75 by 150 mm) specimens cut from the sheets, and marked in accordance with Section 203, using Form TL-10, as outlined in Section 800.

Asphalt coating material will be accepted on manufacturer's certification and test reports.

VDOT representatives will randomly conduct a minimum of two plant inspections per year with cooperation and assistance of the fabricator to insure that specifications and quality control requirements are being met. Visual inspection shall be made by the project inspector when the pipe is received on the project.

Normally, the Fabricator will seal each pipe to be dipped with an embossed tag prior to dipping, so as to identify the thickness of the pipe metal after coating. However, when a culvert to be dipped has been fabricated using the minimum thickness that is specified for that particular diameter pipe, then there will be no necessity for an embossed tag to be attached to the culvert. If the bituminous coated corrugated metal culvert arrives at the project site without an embossed tag indicating thickness, project personnel will automatically know that the culvert has been manufactured using the minimum thickness. Manufacturer's certification will indicate the size, corrugation dimensions, sheet thickness, and coating thickness (if required) for each size and type of pipe shipped.

Standard PC-1 of the Road Designs and Standards specifies the allowable thickness for each diameter pipe. For example, if a 24 in. (600 mm) diameter bituminous coated corrugated metal culvert arrives at the project site without an embossed tag, it would be understood that the thickness of this culvert is 0.064 in. (1.6 mm). If this same size culvert was manufactured using a different thickness metal, then the Manufacturer would be required to attach an embossed tag to the culvert prior to dipping indicating the thickness, in inches (mm).

(i) Glass Fiber Reinforced Epoxy Pipe and Fittings

Glass fiber reinforced epoxy pipe and fittings shall be sampled the same as "Bituminous Conduit and Fittings", as outlined in Sec. 204.14(c)

(j) Polyethylene (PE) Corrugated Pipe

Corrugated polyethylene pipe shall be accepted from approved list.

For a pipe to be included on the approved list, the manufacturer must be on a VDOT approved quality control/quality assurance program, as outlined below, or must certify annually that the pipe shipped will come from only preapproved VDOT tested stock. Pipe not covered by an approved quality control/quality assurance plan must be tested. The sample for culvert pipe shall consist of a length equal to 5 diameters for each lot and a lot is not to exceed 5000 lineal feet (1500 meters). For underdrain pipe, a sample shall consist of a piece 5 feet (1.5 meters) in length for each lot of underdrain and a lot is not to exceed 10000 lineal feet (3000 meters).

See paragraph (n) for instructions on approval of polyethylene sewer pipe used in municipal sewer lines.

All samples shall be marked and shipped the same as outlined in Paragraph (a) above.

VDOT PE Corrugated Pipe Products Quality Assurance Program

Producers of Polyethylene (PE) corrugated underdrain pipe, PE corrugated culvert pipe and fittings conforming to the applicable VDOT specifications or special designs approved by VDOT can be placed on the Materials Division's Approved list of PE suppliers by meeting the requirements of the VDOT PE Corrugated Pipe Products Quality Assurance Program as outlined below.

Quality Control Plan

The producer will submit for VDOT's approval a Quality Control Plan. The plan must be site specific. The plan must indicate in detail how the Producer proposes to control the equipment, materials, and production methods to insure that the specified products are obtained. The plan must list the personnel responsible for production and quality control at the site.

Identification of the physical location of the plant.

The method of identification of each lot of material during manufacture, testing, storage, and shipment.

The method of sampling and testing of raw materials and of the finished product, including lot sizes and type of tests performed.

A plan for dealing with quality control sample failures. This plan must include how the Producer plans to initiate an immediate investigation and how the Producer will implement corrective action to remedy the cause of the problem.

VDOT will review the Producer's written quality control plan. After approval, an on-site inspection will be scheduled. This on-site inspection will verify that the Producer's quality control plan has been implemented and is being followed. See Appendix II-H

If a quality control sample indicates the material or pipe does not meet the specification requirements, the Producer is to initiate an investigation to determine the cause of the failure. The investigation is to include a review of the sampling procedures, the equipment used in the production and the testing of the material, and the testing procedures of the technician. If the cause can be attributed to one of the above categories, the Producer is to take corrective action to bring the material equipment, or procedure into compliance. The Producer is to then record the corrective action on the test report form and take another check sample after the corrections have been made.

If a second quality control sample indicates the material or pipe meets the specification requirements, the Producer may resume normal testing procedures.

If a second quality control sample indicates the material or pipe does not meet the specification requirements, the Producer is to notify VDOT and stop the shipment of the affected pipe. The Producer is to continue the investigation into these failures and work with VDOT to determine the cause.

Testing

The producer will perform the following minimum quality control test procedures on the polyethylene resins and the completed pipe as outlined in AASHTO M294 and AASHTO M252.

TEST

A. Polyethylene Resin

Density

Melt Index

B. Pipe/Tubing:

Tubing Dimensions

Elongation

Workmanship

Environmental Stress Cracking

Perforation Dimensions

Brittleness

Pipe Stiffness

Low Temperature Flexibility

Pipe Flattening

Markings

C. Fitting and Coupling:

Dimensions and requirements

MINIMUM FREQUENCY

For the purpose of this program a lot is considered to be the amount of pipe produced per shift per size or class per machine.

Test Facilities

Producer's facilities, equipment and testing personnel will be adequate to conduct the applicable test as outlined in AASHTO M294 and AASHTO M252 and will be approved by the Department.

Producers will maintain current calibration certificates on all analytical equipment used in testing.

Producers may elect to use the services of an independent commercial testing laboratory acceptable to the Department in lieu of conducting their own tests.

Shipments

Products may be shipped to VDOT projects when all required testing in the lot has been completed with acceptable results. Invoices with the statement, "We certify that these PE pipe and fittings have been tested and conform to the VDOT PE Corrugated Products Quality Assurance Program" shall be on each of the shipping documents and signed by a responsible company representative. One additional copy of the shipping document shall be provided to the monitoring District Materials Section for distribution to the receiving district.

Records

All testing and inspection documentation will be maintained at the producing and the shipping facility for at least two (2) years, and will be made available to Department personnel at their request.

Producer will maintain a Department-approved quality Control Form(s) for each lot, and as a minimum the form(s) will contain the following:

- Plant Identification
- QC Technician's Signature
- Lot Identification
- Production Dates
- Tubing/Pipe Dimensions
- Workmanship
- Perforation Dimensions
- Pipe Stiffness
- Pipe Flattening
- Elongation
- Environmental Stress Cracking
- Brittleness
- Low Temperature Flexibility
- Markings

Applicable specifications AASHTO M252 and AASHTO M294 and VDOT Road and Bridge Specifications and Standards.

Monitoring - VDOT representatives will randomly conduct a minimum of two plant inspections per year with cooperation and assistance of the fabricator to insure that specifications and quality control requirements are being met. VDOT representatives will take random Independent Assurance Samples during the semi-annual inspection at the rate of one sample per size in stock or production. Failure to perform all the program requirements may result in a producer being removed from the Approved List. When the pipe is received on the project, the project inspector shall perform a visual inspection.

(k) Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

This shall be sampled by obtaining one piece a minimum of 3 ft. (1 m) in length by full section from one pipe length of each size per shipment. Fittings may be accepted on modified inspection, as outlined in Sec. 207, since these require no testing or certification. However, fittings should be visually inspected to assure that proper connection can be made.

Semiround PVC plastic underdrain pipe with top shield shall be sampled by cutting one piece a minimum of 2 ft. (0.6 m) in length by full section from one pipe length of each size per shipment.

See Paragraph (n) herein for instructions on approval of plastic water pipe and fittings used in municipal water lines.

All samples shall be marked and shipped the same, as outlined in Paragraph (a) above.

(l) Seamless Steel, Black and Galvanized, and Smooth Wall Steel

Black and galvanized seamless steel pipe shall be sampled the same as "Metal Conduit", as outlined in Sec. 204.14(d), except that black seamless steel pipe will only require one sample, 22 inches (0.3 m) in length, cut from one end of one length of pipe, for each size diameter per shipment. Fittings may be approved on Manufacturer's certified analysis, including zinc coating, as outlined in Sec. 207.

Smooth wall steel pipe used for jacking will not require sampling and testing. This may be accepted on Manufacturer's certification, together with receipt of the physical and chemical analyses, as outlined in Sec. 207.

See Paragraph (n) herein for instructions on approval of steel, galvanized steel, and steel encasement pipe and fittings used in municipal sewer and water lines.

All samples shall be marked and shipped the same, as outlined in Paragraph (a) above.

(m) Structural Plate Pipe, Pipe-Arches, and Arches

Structural steel plates and aluminum alloy structural plates for field bolted pipe, pipe arches, and arches shall meet AASHTO M167 or M219. Material will be accepted on mill certification.

(n) Pipe for Use in Municipal Sewer and Water Lines

Pipe for use in installation, relocation, and or adjustment of municipal sewer and water distribution facilities will not require sampling and testing. This pipe may be accepted on Manufacturer's certification or catalog cuts (in certain cases), as outlined in Sec. 207 for each Manufacturer/Supplier for all quantities. Pipe and appurtenances to be considered under this provision shall include, but not be limited to, the following:

Type of Pipe or Appurtenance

Specification

Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe -

ASTM: D2680.

Cast Iron Pipe (Water or Sewer) -

AWWA: C106 or C108

(ANSI: A21.6 or A21.8).

Cast or Ductile Iron Pipe Fittings -

AWWA: C110 (ANSI: A21.10).

Cast or Ductile Iron Pipe Rubber Gaskets -

AWWA: C111 (ANSI: A21.11).

Cement Mortar Linings -

AWWA: C104 (ANSI: A21.4).

Clay Sewer Pipe, Vitrified, & Fittings -

ASTM: C13(AASHTO: M65).

Concrete Pressure Pipe (Steel Cylinder Type for Water) -

AWWA: C300, C301, C303.

Concrete Pipe, Reinforced (Noncylinder Type for Water) -

AWWA: C302.

Concrete Sewer Pipe Rubber Gaskets -

ASTM: C443.

Copper Pipe or Tubing (Water) -

ASTM: B88.

Corporation Stops & Fittings, Bronze or Red Brass -

ASTM: B62 & AWWA: C800.

Corrugated Metal Casing Pipe,

14 Gauge (2.01 mm thickness) (Water or Sewer) -

Road & Bridge, Sec. 240.04.

Ductile Iron Pipe (Water or Sewer) -

AWWA: C151 (ANSI: A21.51).

Fire Hydrants -

AWWA: C502 or C503

Plastic Water Pipe & Fittings -

ASTM: D2241, ASTM: D1785 or

AWWA: C900 (PVC);

Steel Pipe (Water) -	or ASTM: D2239 (Polyethylene).
Steel Encasement Pipe (Water or Sewer) -	AWWA: C200.
Steel Pipe, Galvanized (Water) -	ASTM: A139.
Steel Pipe Fittings (Water) -	ASTM: A120, Schedule 40 or 80.
Steel Pipe Fittings, Galvanized, Malleable Iron (Water) -	AWWA: C208.
Steel Pipe Coal Tar Protective Coatings & Linings -	ASTM: A47.
Steel Pipe Cement Mortar Protective Coatings & Linings -	AWWA: C203.
Valves -	AWWA: C205.
Water Meters -	AWWA: C 500, C504, or C507.
	AWWA: C700, C701, C702 or C703.

(o) Plant Inspections

In addition to the inspection of pipe, inspections may also be made of the concrete and corrugated metal pipe plants by Central Materials personnel, as directed by the State Materials Engineer.

Each Department Representative at a concrete pipe plant will submit to the Central Office Laboratory annually a sample of cement, fine aggregate, coarse aggregate, and wire reinforcement used in the production at the particular plant. These samples should be marked as "annual quality tests", and actual submission of samples should be staggered to such a degree that the sampling will not occur on the same date each time. These samples will be used for checks on conformance to specifications. Copies of the test results will be forwarded to the District Materials Engineer and the Plant Inspector for their files.

(p) Reports

Normally, all pipe for culverts will be 12 in. (300 mm) and above in diameter. After any of this pipe is inspected and found to be satisfactory, each section of pipe shall be stamped or have a seal secured to the end of the pipe as evidence of inspection. The inspection report, Form TL-109, issued by the Plant Inspector, manufacturers certification, or the inspection report issued by a commercial testing agency, should show certain specific information regarding the pipe, which should also agree with the information shown on the laboratory test report, if any, issued for the particular lot of pipe.

Normally, all pipe for sewers, drains and miscellaneous purposes will be less than 12 in. (300 mm) in diameter. For this reason, it will be impractical or impossible for the Plant Inspector in many cases to seal or stamp each individual section of pipe. Of course, where possible, the pipe should be sealed or stamped. However, if this is impossible or impractical, then some method should be used to indicate to the Project Inspector that the load of pipe received has been tested, inspected, and approved.

Form TL-9 may be used for this purpose and should accompany each load of pipe to the job site, as outlined in Sec. 800. The card should show the exact type of pipe in the shipment, the nominal diameter, total length of pipe in the shipment, and the number of sections in the shipment.

In either case, whether the shipment is for use in culverts or in sewers, drains, or miscellaneous, an inspection report, Form TL-109, or similar report from a commercial testing agency, should be issued by the Plant Inspector covering the shipment of pipe in more detail, as outlined in Sec. 800. The information to be included on Form TL-109 or inspection report, in addition to the usual information, such as date shipped, carrier number, seal number or inspection stamp, and identification, should include such applicable descriptions as length, type, class, strength, diameter, rise, span, thickness, etc. Any miscellaneous couplings, fittings, connections, or end sections included in the shipment should be shown on Form TL-109 in units of each.

Sec. 204.27 Reserved

(Previously Plank, Premolded Asphalt.)

Sec. 204.28 Poles and Posts

(Secs. 221, 242.02, 701.02, and 700.02) See Sec. 207 for details of acceptance of poles and posts on modified inspection.

(a) Fence, Chain-Link

(1) End, Corner, and Gate Posts and Braces

End, corner, and gate chain-link fence posts and braces, (welded or seamless steel galvanized pipe) or galvanized roll-formed sections, shall be sampled by selecting at random one whole post from each 500 posts, or fraction thereof, in the shipment.

Aluminum alloy pipe fence posts, are approved on Manufacturers' certified physical and chemical analyses. Sampling will not be necessary, and the posts may be accepted on modified inspection, as outlined in Sec. 207.

All other samples shall be marked and shipped to the Central Office Laboratory, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. No container is necessary.

(2) Line Posts and Braces

Line chain-link fence posts and braces (round galvanized steel posts), galvanized steel H- column, or galvanized roll-formed sections, shall be sampled the same, as outlined for the same materials in Paragraph (a)(1) above.

(b) Fence, Standard -

(1) Metal Posts and Braces

Sampling of metal posts and braces for standard fence shall be the same, as outlined for galvanized pipe and roll-formed sections in Paragraph (a)(1) above. Steel posts for snow fence and miscellaneous small signs will require no testing or certification, and may be accepted on modified inspection, as outlined in Sec. 207.

(2) Wood Posts and Braces(Treated)

Treated wood fence posts and braces for standard fence normally will not require sampling on the project. The preservative treatment shall be accepted on certification as outlined in Section 204.29 and Section 204.33. Locust posts require no treatment, testing, or certification. See Sec. 207 for additional details of acceptance of wood posts on modified inspection.

(c) Guardrail

(1) Concrete Posts

Concrete guardrail posts shall be sampled by obtaining a specimen of the concrete during the manufacture of the posts. Three (3) concrete cylinders 4 in. (100 mm) in diameter and 8 in. (200 mm) in height shall be molded at the place of fabrication, in accordance with the procedure outlined in Sec. 400. At least one set of 3 cylinders shall be made each day during which posts are being fabricated. The cylinders shall be submitted to the District or Central Office Laboratory after having been properly cured in the same manner as the concrete posts.

Cylinders should be packed and marked, in accordance with Sec. 203, using Form TL-13, as outlined in Sec. 800.

(2) Steel Posts

Steel guardrail posts and steel guardrail offset blocks will be accepted by visual inspection with annual certifications from the Suppliers or Erectors, as outlined for steel beam guardrail in Sec. 204.18. See, also, Sec. 207 for additional details of modified acceptance. It will be necessary that District personnel obtain check samples consisting of a minimum of one whole post and offset block, selected once each 6 months per construction District, and submit to the Central Office Laboratory for testing. This sample normally is taken at the project.

All samples of posts and offset blocks shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. No container is necessary.

(3) Wood Posts

Treated wood guardrail posts will be handled the same, as outlined in Paragraph (b)(2) above.

(d) Lighting Standards, High Mast Lighting Standards, Luminaires, Mast Arm Poles, Combination Mast Arm-Luminaire Arm Poles, Pedestal Poles, and Other

(1) Aluminum

Aluminum poles, including breakaway, for use as any of the above noted types of poles, will be accepted on modified inspection, as outlined in Sec. 207. The Manufacturer shall certify that the product meets the noted AASHTO specification. Also, if poles are required to meet certain alloy specifications, such as ASTM, then a Manufacturer's certified physical and chemical analysis is required. The above requirements also apply to aluminum alloy breakaway support couplings.

(2) Steel

Steel poles, including breakaway, for use as any of the above noted types of poles, shall be accepted the same, as outlined in Paragraph (d)(1) above. This includes steel shafts and base flanges for high mast lighting standards. See also Sec. 204.32 for additional details of modified acceptance.

(e) Traffic Sign

(1) Aluminum Alloy Poles and Breakaway Supports

Aluminum alloy sign poles, including breakaway supports, are approved on Manufacturers' certified physical and chemical analyses. See Sec. 207 for additional details of acceptance on modified inspection.

(2) Galvanized Steel Sign Poles and Posts

Galvanized steel sign poles and posts shall be approved for use on Manufacturers' mill analyses and shop inspection, as outlined for modified inspection in Secs. 204.32 and 207 herein. If poles or posts are painted, the paint shall be accepted as outlined in Sec. 204.24.

(3) Rolled Rail Steel Poles and Posts

Rolled rail steel sign poles and posts shall be approved for use the same, as outlined in Paragraph (e)(2) above.

(4) Structural Steel Poles and Posts

Structural steel sign poles and posts shall be approved for use the same, as outlined in Paragraph (e)(2) above.

(5) Treated Wood Poles and Posts

Treated wood sign poles and posts shall be accepted as outlined in Section 204.29 and Section 204.33.

(f) Traffic Signal -

(1) Steel Poles

Steel traffic signal poles shall be approved for use the same, as outlined in Paragraph (e)(2) above.

(2) Treated Wood Poles

Treated wood traffic signal poles shall be accepted as outlined in Section 204.28(e)5 above.

(g) Reports

Laboratory tests of concrete cylinders for concrete guardrail posts will be reported on Form TL-26 (TL-26B, if computerized test report output form), tests of steel guardrail posts on Form TL-25, and tests of chain-link and metal fence posts and preservative treatments for treated wood posts on Form TL-47. Inspections of all posts will be reported on Form TL-109. See Sec. 800.

Sec. 204.29 Preservatives, Timber

Wood treating facilities shall certify the treatment of their product according to the following procedure:

Each charge of treated wood will be tested for penetration and retention at the plant by the wood treating facility.

- a. Penetration shall be tested as per current American Wood Preservers Standards
- b. Retention shall be tested using X-ray fluorescence (ASOMA).

Records of the testing shall be kept on file at the wood treating facility for three years.

VDOT Materials or contracted testing agency personnel shall monitor the testing on a periodic basis – minimum semiannually.

During monitoring, the inspector will observe the taking of the borings and the testing for penetration and retention. The results of the test/s, and the leftover ground wood sample/s, will be forwarded to VDOT Central Materials Lab. The VDOT lab will test the monitor sample/s and compare the results with those obtained by the plant.

If the plant results are verified, the wood treating facility will be allowed to certify their product/s. If the results cannot be verified, the wood treating facility will not be allowed to certify their product until corrective action has been taken.

The wood treating facility will furnish a certification on each charge and/or shipment of material furnished to the Contractor as follows:

Name of Manufacturer certifies that the CCA-treated wood products have been treated in accordance with Section 236.02(c)4 of the VDOT Road & Bridge Specifications and meet the applicable minimum penetration and retention requirements.

The Contractor must keep these certifications on file along with all other certifications and test records of materials to be furnished to VDOT projects.

It is the responsibility of the Contractor to verify with VDOT the names of wood treating facilities that are authorized to certify treated wood poles or posts.

Sec. 204.30 Reflective Materials

(Secs. 231, 234, 235, 246, and 701) See Sec. 207 for acceptance of reflective materials on modified inspection procedures.

(a) Pavement Markings

(1) Sampling, Testing and Approval

Sampling of reflectorized pavement markings, including glass beads, in the field will not normally be necessary. This material is normally pre-sampled and pre-tested. Materials sampled at the point of manufacture should arrive at the job site or storage area with evidence of test as outlined below. If no such evidence is present, then representative samples need to be taken and shipped to the Central Office Laboratory, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(a) Glass Beads

Glass beads will be sampled at the point of manufacture by representatives of the State Materials Engineer and forwarded to the Central Materials Laboratory for testing and acceptance or accepted under an approved Quality Control Plan, namely the Virginia Glass Bead Acceptance Plan (VGBAP).

The Virginia Glass Bead Acceptance Plan (VGBAP) involves the sampling, testing, documentation and certification of glass beads by the manufacturer at the manufacturing site in combination with a VDOT monitoring effort. VDOT reserves the right to discontinue acceptance of glass beads in the event that verification test results indicate non-specification material is being provided or test procedures are not being followed.

Each batch of glass beads manufactured for use in Virginia must be sampled and tested. A batch is defined as no more than 132,000 pounds (60 metric tons). From the batch, X number of units or bags of glass beads will be selected for testing, X being equal to the cube root of the number of units or bags in each batch. For example a batch of 132,000 lbs. (60 metric tons) contains 2640, 50 pound (23 kg) bags. The cube root of 2640 is 14. Therefore, 14 bags from a 132,000 lb. (60 metric ton) batch need to be selected. The 14 bags will be opened, split down using a 16:1 splitter and combined until a quart (1 liter) sample is obtained. This quart (1 liter) sample is further split in the laboratory until a 0.11 pound (50 gram) test sample is obtained and will be tested in accordance with the specified methods. Glass bead testing equipment (Roundometer, Sieves, Balances, Scales, etc.) at the manufacturing facilities will be inspected by VDOT personnel or its representatives on an intermittent basis. A file of test reports representing this batch of glass beads must be maintained. A copy of the certified test reports must be provided to the VDOT Central Materials Division. Cooperation with VDOT and/or its representatives during periodic verification of certified test reports is required.

The manufacturer must perform the following responsibilities with the assistance of a VDOT approved commercial testing agency.

Quality Control Sampling by the manufacturer will be at the rate of one sample per batch of glass beads produced for use in Virginia.

The manufacturer is to test each batch of glass beads in accordance with ASTM D-1155 Procedure B for Roundness and ASTM D-1214 for Sieve Analysis. A moisture resistance test should also be performed.

Monitor samples will be taken to verify the manufacturer's testing procedures. The monitor sample will be taken at periodic intervals at the manufacturer's facility at the average rate of one per month. The sample taken for monitor acceptance will be a "split " sample, with the manufacturer testing a portion of the sample and VDOT's Central Materials Division testing the other portion.

Monitor samples will consist of one unit or bag of glass beads being randomly selected by VDOT personnel or its representative. This unit or bag will be split in the usual manner by the manufacturer's personnel in the presence of the VDOT's Inspector to obtain two (2) pint (0.5 liter) samples. One pint (0.5 liters) will be appropriately labeled and tested by the glass manufacturer, while the other will be tested by the VDOT Central Materials Division. VDOT will perform the tests in the same manner as the manufacturer.

The manufacturer is to maintain a file of certified test reports for all glass beads shipped to VDOT facilities as well as Contractors that perform work for VDOT. These reports are to be kept by the manufacturer for at least 12 months and are to be available for verification by VDOT personnel. A copy of the certified test report is also to be sent to the VDOT Central Laboratory.

The test reports shall contain the following information:

Manufacturer's name and address

Quantity represented

Pallet numbers represented by the test

Pallet numbers sampled for the test

Unique Report Number

Statement indicating that "the manufacturer certifies that these are the test results obtained on glass beads tested under the Virginia Glass Bead Acceptance Program." Test Results obtained on the sample of glass beads.

All shipping documents will contain sufficient information such that at any point, the glass bead pallet numbers may be "back tracked" to the original test results.

Shipping documents are to be provided to Contractors or VDOT for all shipments.

(b) Traffic Paint

Traffic paint shall be sampled the same as "Paint", as outlined in Sec. 204.24.

(c) Thermoplastic

Block type thermoplastic marking materials will require 1 block sampled and tested at the Central Office Chemistry Laboratory. Granular materials will be sampled by splitting to obtain a 1 quart (1 liter) sample for testing by the Chemistry Laboratory.

(d) Preformed Tape

Approved List

(e) Polyester Resin

Polyester shall be sampled the same as "Paint", as outlined in Sec. 204.24, except that the catalyst will not be sampled.

(f) Epoxy Resin

Epoxy resin shall be sampled the same as "Paint", as outlined in Sec. 204.24, except that both components shall be sampled.

(2) Acceptance

(a) After appropriate testing has been completed, the manufacturer of the material will attach a certification to their shipping documents similar to one of the following:

Certification I

We certify that our product (batch or lot number) on invoice number _____ or shipping ticket number has been sampled, tested, and approved by VDOT Materials Division as indicated by Laboratory Test Number, MS ____, or by an approved Quality Control Plan as indicated by its unique test number ____.

Certification II

We certify that our product has been tested, approved, and placed on a qualified products list. We certify that our (batch or lot number) on invoice number is the same product that was tested and approved. Indicated on the shipping document will be the test number from the approved list.

All catalyst and sealers and adhesives for use with the markings shall be included on a shipping ticket covered by one of these certifications.

The individual pavement marking items will require certifications as indicated below:

A. Construction Pavement Markings

Type B	Certification I
Glass Beads	Certification I
Type C Tape(temporary)	Certification II
Type D Tape (removable)	Certification II
Type E Tape (removable)	Certification II

B. Permanent Markings

Type A	Certification I
Glass Beads	Certification I
Type B	
Class I	Certification I
Class II	Certification I
Class III	Certification I
Class IV	Certification II
Class V	Certification II
Class VI	Certification II
Glass Beads	Certification I

(b) Materials shipped directly from the manufacturer for use on a specific project, and materials shipped to a central storage site for use on multiple projects shall be tracked by an inventory tracking program maintained by the contractor. The program shall be under the control of a certified pavement marking

technician who will keep a running inventory of all pavement marking materials shipped from that inventory, including all related catalysts and sealers.

A ledger form (see sample form Appendix II-E-1) shall be used to record all shipments to and from the Contractor's stock. A separate ledger shall be maintained for each type of material and for each manufacturer. All ledger entries must be substantiated by manufacturer shipping documents which must include the Certification I & II statements. Ledger entries for materials received into stock must indicate quantity, units, date of receipt, manufacturer's lot or batch number, VDOT or other appropriate test numbers and balance on hand. When materials are taken from inventory for shipment to a project, ledger entries must include quantity shipped, units, project number, date shipped, unique delivery ticket number(see below) and balance on hand. All ledger entries must be initialed by the certified pavement marking technician and such initial certifies that all entries are accurate and correct.

Certified Delivery Ticket When materials are shipped from inventory, the contractor shall prepare a delivery ticket (see sample form, Appendix II-E-2) for each shipment and for each project. The delivery tickets shall be numbered sequentially and contain the same data as the ledger entry for that material or job. Delivery tickets with missing information will not be accepted. The delivery ticket shall have the statement that "Materials shipped under this certification has been tested and approved by VDOT as indicated by laboratory test numbers listed hereon." and shall be signed by the certified pavement marking technician. In lieu of certified delivery ticket, the contractor may make the appropriate certification on the C-85.

The certified delivery ticket is the materials acceptance document for those suppliers under the inventory tracking program. The delivery tickets are to be retained in the project records and the test numbers thereon are to be entered into the materials notebook. The certified delivery ticket is to be delivered to the inspector prior to the beginning of work and no undocumented material should be allowed to be used.

Monitoring-The materials Industrial Technician will perform periodic inspection at the pavement marking contractor's storage site and of project records to ensure that the records are being kept in compliance with the above. For those projects where the material is shipped directly to the project, the inspector will contact the materials industrial technician for monitoring the use of material. The industrial technician shall be given free access to all files used in the tracking program and provided with copies of any documents from such files as may be requested. If the Industrial Technician determines that material is untested or needs to be retested, samples will be taken at the appropriate rate and forwarded to the Central Office Laboratory. The contractor shall not ship material in question until appropriate test coverage is obtained.

The industrial technician will be responsible for obtaining a copy of each certified delivery ticket and making distribution to the receiving District Materials Engineer and the shipping District Materials Engineer.

(b) Pavement Markers and Delineators

Pavement markers and delineators will be accepted on approved list.

(c) Retro-reflective Sheeting

Retro-reflective sheeting for use on sign blanks, will not require sampling in the field. Retro-reflective sheeting for use on barricades, and channelizing devices shall be accepted on visual inspection. This is approved upon receipt of Manufacturer's Certification. See also Sec. 207 for additional details on acceptance on modified inspection.

Sec. 204.31 Soils and Granular Materials

(Secs. 207 and 208) Soils and granular materials shall be sampled, as outlined in Sec. 300.

Sec. 204.32 Steel

(Secs. 212.02(j), 223, 224, 225, 226, 227, 238, 701, 703, and 705) See Sec. 206 for Independent Assurance sampling requirements. See Sec. 207 for steel that may be accepted on modified inspection.

(a) Castings, Forgings, and Shafting

Steel, ductile iron, or malleable castings and steel forgings and shafting will be sampled and tested at the point of manufacture. Certified physical and chemical analyses of these tests submitted to the Materials Division will be the basis of approval, and visual inspection in the field will be all that is required, as outlined in Sec. 207. See also Sec. 207 for exceptions to the above in cases where cast steel, ASTM A27, and cast iron (gray), ASTM A47 are used in rest area construction.

Gray-iron castings shall be sampled by the Department's Representative and the samples submitted to the Central Office Laboratory for tests.

(b) Grid Flooring

Steel grid flooring will be accepted on the basis of Manufacturer's certification, as outlined in Paragraph (a) above.

(c) Miscellaneous Metals (Timber Connectors)

Steel for timber connectors will be accepted on the basis of Manufacturer's certification, as outlined in Paragraph (a) above.

(d) Prestressing Tendons

Prestressing tendons, consisting of seven-wire stress-relieved strand or stress-relieved wire, shall be sampled in the casting yard by the Department's Representative. One sample shall be submitted to the Central Office Laboratory for each 7 coils used in State work. One sample shall consist of 2 pieces each 6 ft. (2 m) in length and full diameter, and shall be cut from a representative reel in the shipment.

The sample should be attached securely with wire or nails to a straight rigid object, such as a small board of appropriate length, for shipment. DO NOT TIE STRAND OR WIRE IN A TIGHT CIRCULAR LOOP. The specimen shall be marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800. Included on the form, in addition to other pertinent information, should be the reel number from which sample is drawn, the additional reel numbers of all strand represented by the test sample, and the quantity, in lineal feet (meters), represented by these reels. Strand or wire should not be used until the Materials Division has notified the Inspector of the test results.

(e) Reinforcement

(1) Bars, Plain and Deformed

Plain and deformed steel reinforcing bars will be accepted based on certification provided by the fabricator. The certification shall state that the supplied steel is domestic material, and meets the requirements of the specified ASTM designation, including grade number. Test report coverage will no longer be issued by a plant inspector, therefore, the project inspector must insure that all certifications are in order. A certification shall be provided with each shipping ticket or the

certification shall be a part of the shipping ticket. The project inspector will forward to the District Materials Engineer, one copy of the document containing the certification.

When epoxy coated bars are furnished, the fabricator is to also supply an additional certification generated by the coater stating that the bars were coated with an epoxy coating which has been VDOT pre-approved (Manual of Instructions - Approved Epoxy Coatings List) and that the coating was applied, inspected, and protected in accordance with AASHTO M-284.

The fabricator is to maintain a file of mill analyses for all heat numbers of bars supplied to a project. Files of mill analyses and certifications are to be maintained for three years after final shipments to a project. These documents are subject to periodic verification by VDOT authorized representatives.

A Monitor sample will be taken by the project inspector with the contractor's assistance consisting of two specimens, 24 inches (0.6 m) in length, of a selected size per structure. The bar size selected will be the predominant size, epoxy coated (if available), utilized on all structures containing 5000 lbs. (2500 kg) or more, except that for projects containing multiple structures, different sizes will be selected, when possible, from each structure. Bars must be cut, not burned through. The two pieces from each bar shall be fastened together securely, and a sample card (TL-10) attached to each pair of bars which constitute a sample. Each sample of steel reinforcing bar shall be marked, in accordance with Section 203, using TL-10, as outlined in Section 800. Samples shall be submitted to the Central Office Laboratory, unless the District Laboratory is equipped to perform the test. Epoxy coated bars will be tested for thickness of the epoxy coating, and the bond of the epoxy, in addition to other tests performed on the reinforcing steel.

The District Materials Section or the Central Laboratory will perform inspections of the fabricators at least every six weeks, and the epoxy coating facility at least every six months to verify that the quality control procedures are being followed. The inspections will be performed using the check lists in Appendix II-D and II-E.

(2) Bars, Longitudinal, for Continuous Reinforced Concrete Pavement

Longitudinal steel bars for continuous reinforced concrete pavement shall be sampled the same, as outlined in Paragraph (e)(1) above with one monitor sample being taken by the project inspector for each two lane miles (three lane kilometers) of pavement.

(3) Bar Mat

Bar mat may be accepted on certification as outlined in Section 207.02(36)e.

(4) Spiral Wire

Spiral wire may be accepted on manufacturer's certification in accordance with (e)(1) with a minimum of one monitor sample per project being submitted for testing. When used at precast or prestressed plants, semi-annual check samples should be submitted.

(5) Structural Steel

Structural steel for use as reinforcement will be accepted, as outlined in Paragraph (f) below.

(6) Welded Wire Fabric

Welded steel wire fabric (wire mesh) or welded deformed steel wire fabric for use as concrete reinforcement will be accepted by certification as outlined in (e)(1) above with a minimum of one monitor sample submitted when the quantity exceeds 75,000 square feet (7,000 square meters) per

project. The sample is to consist of approximately 3 feet square (1 meter square), cut from any part of the roll at random.

The fabric should be securely tied in a flat position between 2 pieces of corrugated cardboard. Each sample shall be marked, according to Sec. 203, using Form TL-10, as outlined in Sec. 800. Samples are to be submitted to the Central Office Laboratory, unless the District Laboratory is equipped to perform the test.

(7) Supports for Reinforcing Steel

In bridge deck slabs and slab spans, the lower mat of reinforcing bars shall be supported by the bolster type support and the upper mat by the high chair type support.

Where the Contractor elects to use stainless or galvanized bar supports, the bar supports may be accepted by a letter of certification from the Manufacturer or Supplier certifying that the bar supports conform to the applicable material and coating specification requirements. If such a letter is not available or if it is determined that further testing is necessary, submit one bar support sample per type and manufacturer to the Central Office Laboratory for testing.

Where the Contractor elects to use bright metal bar supports with plastic coated tips, they may be accepted on visual inspection, provided the reinforcing steel will be maintained at its required location and the plastic coating extends at least 0.5 in. (13 mm) above the form surface as specified. In order that plastic tips will not be displaced during installation, the premolded, slip-on tips must fit tightly on the support, and dipped plastic coatings must adhere tightly to the metal.

In the event the Contractor requests to use protective coatings other than those specified, approval may be given at the District level, based on evaluation by the District Bridge and Materials Engineers. Careful consideration should be given to the proposed spacing, the structural capacity of the supports to maintain reinforcement in the required location, and the ability of the supports to resist rusting where the tips are exposed. If the durability or structural capacity is questionable, the Central Office Laboratory should be consulted.

(8) Rust

When the use of reinforcing steel is questionable, due to the presence of rust, the following interpretations of the specification will govern:

- (1) The light, powdery red rust coating that initially appears on steel is of no serious consequence and can be safely disregarded.
- (2) Further development of the rusting stage, as described in Item (1) above, leads to a thick, dark colored scale of rust. This scale, as long as it is tight and not loose, is not detrimental to bond, and therefore, the steel may be used in concrete. It would be well at this point, however, to carefully observe to determine whether or not the flake, in fact, is tight and not loose.
- (3) The condition listed in Item (2) above develops to form a loose, flaky scaling which can be detrimental to the bond between the concrete and the reinforcing steel. If this condition occurs, the steel should be cleaned and rechecked for cross-sectional area before use in the concrete. This cleaning operation could be accomplished by brushing either with burlap or steel brushes, or by sand blasting.

The fact that rusted steel, under certain conditions, may be used in concrete should not excuse careless handling and storage of steel.

(9) Verifying Quantity

In order to determine the quantity of reinforcing steel to be used for payment, the following criteria will govern:

Shipping invoice weights may not agree with plan quantities. As long as the test report quantity and the plan quantity agree within the plus or minus one percent, it will not be necessary to correct or check for missing invoice tickets. However, a note should be placed in the project materials notebook which states that the structure has been built in accordance with the plans and that the difference between the pay quantity and the invoice tickets total quantity is assumed to be due to, permissible variations in weight, fabrication tolerances, or in the accuracy of computations.

(f) Structural

Inspection and acceptance of structural steel items generally will be divided into three categories.

(1) Sampling and Testing

The sample shall consist of two bolts, nuts and washers per diameter per project and will be obtained at the source by a representative of the Central Office Laboratory. Manufacturer's Mill Analysis is required to be submitted with sample.

- (a) Anchor bolts for railings.
- (b) High strength bolts (A325-A490).

(2) Mill Analysis

It is the responsibility of the contractor to request the Mill Analysis when placing the order for structural steel. The following materials may be accepted with Mill Analysis and/or certification as indicated.

- (a) Nuts, studs, and washers for use in elastomeric expansion dams.
- (b) Corrugated metal deck form and accessories (include Certificate of Compliance).
- (c) Weld filler metal accepted from approved list of electrodes and wire flux combinations. See Section 209.
- (d) Shear studs accepted from approved list of brand names. See Section 209.
- (e) Lighting standards (low level), mast arm poles, combination mast arm-luminaire arm poles, pedestal poles (including breakaway),. See special certification Section 207.
- (f) Poles, posts for traffic signals and signs.
- (g) Bolts, general use, AASHTO M314 Grade 36 - Visual inspection only. Check for manufacturer's head marking. When quantities exceed 100, sample in accordance with (f)(1) above.
- (h) H-Piling - See Section 204.25(b) for details of acceptance.
- (i) Anchor bolts, nuts, and washers will be accepted on a Certificate of Compliance provided by the fabricator. The Certificate of Compliance shall state that the steel is of Domestic material (if applicable) and meets the requirements of the specified ASTM/AASHTO designation. The fabricator or supplier shall maintain the material certification for a period of five years from the date of shipment. In addition, when galvanized bolts, nuts, and washers are supplied, the fabricator or supplier shall maintain a certification from the galvanizer stating that the bolts, nuts,

and washers were galvanized in accordance with ASTM A153. The certification shall state the weight of the coating in oz/ft² (g/m²) or the coating thickness in mils (mm). The certificate of compliance shall be similar to the certificate for high strength bolts.

(3) Shop Inspection:

The fabricating shop shall obtain the mill analysis from the manufacturer and submit one copy to the shop inspector for review and acceptance. The shop inspector shall submit copies of the inspection report as shipments are made. The inspector shall retain the copy of the mill analysis for record. Three (3) copies of the fabrication inspection reports shall be forwarded to the Structures Section, with one of each forwarded to the District Materials Engineer, Project Inspector and one will be retained by the Structures section. (See Section 207 for details of acceptance of electrical and traffic signal structural elements).

Miscellaneous steel, such as sole and gusset plates, may be fabricated from stock material, providing the Fabricator submits to the shop Inspector one copy of the mill analysis for this material and a letter certifying the material used is actually that which is represented by the analysis. In addition, the letter shall state the amount of miscellaneous steel used, and this amount shall never exceed 10 percent of plan quantities. Distribution of the mill analysis and fabrication inspection report will be the same as outlined previously.

The inspector's records will be audited a minimum of semi-annually by the Central Office, Structures Section. Approximately 25 percent of the inspector's records, since previous visit, will be audited.

When placing an order for high strength bolts, the fabricator shall specify the manufacturer to furnish, with each shipment, the test report as indicated in ASTM A325 or A490. Two (2) copies of these reports shall be submitted by the fabricator to the fabricating shop inspector, one of which will be retained by the inspector. Accompanying these test reports will be a Certificate of Compliance, such as the one outlined below, to be submitted by the Fabricator. One (1) copy each of the test reports and certificate of compliance will be submitted by the inspection agency to the Central Office Laboratory Structures Section.

"FABRICATOR'S LETTERHEAD

CERTIFICATE OF COMPLIANCE

We certify that the high-strength bolts:

Furnished to _____ (Name of Contractor)

For use on _____ (Project Number)

In the amount of _____ pcs. _____ (Size) Heavy Hexagon Bolts

_____ pcs. _____ (Size) Heavy Hexagon Nuts

_____ pcs. _____ (Size) Circular Washers

Manufactured by _____

Meet the requirements of the pertinent project plans, special provisions, and specifications of the Virginia Department of Transportation in all respects to the best of our knowledge and belief. The attached test report represents the last completed set of mechanical tests which were performed by the Manufacturer at the time of our order.

(Signed) _____

(Title) _____ "

This certificate is to be signed by a person of authority representing the Fabricator. There will be no necessity for this certificate to be notarized.

The following structures are normally shop inspected at the fabricating site.

(a) Carbon and high strength steel structures:

1. Rolled beam and plate girder bridges, anchors, bearing and diaphragms.
2. High mast lighting standards and anchor bolts.
3. Sign structures and anchor bolts.
4. Building frames.
5. Miscellaneous steel structures involving welding.
6. Corrugated metal pipe.
7. All components of drop inlets (angles, bars, and/or pipes) shall be accepted by the Department's representative from mill analysis submitted by the Fabricator. The units shall be visually inspected by the Department's Representative for conformance with specifications. It will be satisfactory for the Manufacturer to furnish a galvanizing certification that the unit conforms to the specification requirements (2 oz./sq.ft.) (600 g/m²). See Section 207 for provisions for acceptance on modified inspection.

(4) Corrugated Metal Bridge Deck Forms:

The Manufacturer shall submit a certificate of compliance with each individual shipment of material delivered to the project. In lieu of the actual certificate of compliance accompanying the shipment a statement noted on the shipping document, stating that the material conforms to the requirements of the Virginia Department of Transportation, will be acceptable. The Contractor shall be responsible to submit one copy of each shipping document and 3 copies of the Manufacturer's certificate of compliance to the Central Office Laboratory Structures Section. The Contractor may delegate this function to the Manufacturer. The Structures Section will review and submit a copy of the approved certificate of compliance to the District Administrator (District Materials Engineer) and Project Inspector as outlined above for mill analysis. This method of acceptance does not alter the requirement that shop drawings be submitted to the Department for review. In addition, the District Materials Engineer should periodically random sample this material and submit for test to the Central Office Physical Laboratory. The Certificate of Compliance should follow the general outline as shown.

"SUPPLIER'S LETTERHEAD

CERTIFICATE OF COMPLIANCE

CORRUGATED METAL DECK BRIDGE FORMS

DATE _____

PROJECT _____

CONTRACTOR _____

SHIPMENT _____

MATERIAL FOR STRUCTURE _____

This material is covered by this Fabricator's certification statement certifying that the materials and methods utilized in the manufacture of the corrugated metal bridge deck forms are in compliance with ASTM A653, Grade SQ40, SQ50, or SQ80, coating designation G165. Supports, closures and other fabricated parts are in compliance with ASTM A653 Grade SQ33, SQ40, SQ50, or SQ80, coating designation G165.

Based on mill certificates, it is certified that representative samples of the listed materials have been tested and that the test results conform to the requirements of noted specifications. Copies of these certified mill test reports are on file and are available to the Virginia Department of Transportation upon request.

Material description covered by this certification statement is as shown:

MATERIAL DESCRIPTION

<u>MATERIAL</u>	<u>SIZE</u>	<u>QUANTITY</u>
_____	_____	_____
_____	_____	_____

(over or attached sheets for additional materials)

SIGNED _____

TITLE _____ "

(5) Weld Testing

Weld testing is performed using nondestructive evaluation methods, such as, radiographic, ultrasonic, or magnetic particle methods, as outlined in pertinent VTM's.

The Contractor shall provide a working space for radiographic examination of welds, and shall permit this area to be free for a minimum of 6 hours per inspection visit.

The Central Office Laboratory should be contacted if there is any question of the quality of groove welds in new construction, or if there is suspicion of fatigue cracks in old structures.

(6) Welder Qualifications

The Contractor shall submit to the inspector, for each Welder, Welding Operator, or Tacker employed on the project, a copy of the certification of qualification and also a certificate stating that the Welder has not exceeded any period of three months since the date of qualification without performing satisfactory welding in the required process. The qualification certification shall state the name of the Welder, Social Security Number, the name and title of the person who conducted the examination, the kinds of specimens, the positions of welds, the results of the tests, and the date of examination. The qualification certification shall be done by a recognized agency which is staffed and equipped for such purposes. Project Inspectors should record the Welder's name, type, and position of weld qualified, and the card number in the project diary for documentation. The Inspector, upon receipt of the certification documents for field welding, shall perform the following procedures:

- (1) Contact the District Representative designated as being responsible for review of welding documents.

(2) In the event the Welder, has been approved on another project in the District, the District Representative can give immediate approval.

(3) If the Welder has not been previously approved in the District, the District Representative is to contact, the Central Office Laboratory Structures Section for approval and then advise the Inspector accordingly.

(4) Upon receipt of verbal approval from the District Representative, the Inspector is to advise the Contractor and welding may proceed.

(5) The Inspector should then forward the certification along with all other related information to the State Materials Engineer. Written approval for documentation of records will follow through normal channels. The validity of the certification should be established before the welding is performed.

It is suggested that a form similar to the one shown below be given to the Contractors at the preconstruction conference, on which the certificate of qualification can be made. This form can then be completed and submitted to the Inspector at the appropriate time. General outline of the form is as follows:

Date _____

Project _____

FHWA _____

County or City _____

TO: _____, Resident Engineer

SUBJECT: Welder Qualifications

Transmitted herewith is a copy of Welder certificate of qualification for _____ (Name of Welder), (Cert. No. _____), who will be performing the welding on the above noted project. I/we certify that the above Welder has not exceeded any period of three months since the date of qualification without performing satisfactory welding in the required process.

Signed: _____ Title: _____
_____ Company _____

Note: Resident Engineer to send copies of this letter and certificate of qualification to the District Representative responsible for review of welding documents.

(7) Special Welding Procedures

All field weld splices of girder and rolled beam are required to conform to the quality standards of the American Welding Society.

(a) All flange splices to be ground flush.

(b) All exterior sides of web splices in exterior members to be ground flush.

(c) Cope holes are not to be filled. Radius of cope to be ground smooth and in a true radius.

(d) Temporary erection bolt holes to be filled with high strength bolts and tightened in accordance with Road and Bridge Specifications.

(8) Studs

The first 2 studs welded on each girder or beam shall show 360° flash, and withstand bending 30° from their initial axes by striking the head of the stud with a hammer. If the first 2 studs do not show 360° flash, or fail in the weld during bending, 2 additional studs shall be tested after the welding equipment is adjusted. If these also fail, a separate test piece shall be used until the proper adjustments have been made to the equipment. Once this test has passed, production welding may take place. Any stud that has less than 360° flash shall be bent 15° from its original axis in a direction away from the missing portion of flash and if any failure occurs it shall be replaced.

(9) Electrodes

If low hydrogen 7018 electrodes are used in welding, they shall be stored in ovens at a temperature of at least 250°F (120°C). If the electrodes are out of the oven over 4 hours, they are to be dried as AWS Specifications.

Sec. 204.33 Structural Timber and Lumber

(Sec. 236) See Sec. 207 for details of acceptance on modified inspection. Sampling of structural timber, timber piling, lumber, posts, etc. will not be necessary in the field. The penetration and retention of the preservative treatment is determined, as outlined in Sec. 236 of the Road and Bridge Specifications, at the point of treatment in the case of treated timber or lumber. The lumber shall be visually inspected for grade mark. Inspection of timber and lumber materials will be reported on Form TL-109, as outlined in Sec. 800.

Sec. 204.34 Water

(Sec. 216) Water that has been approved for drinking purposes may be used without test in hydraulic cement concrete and cement or lime stabilization, as outlined in Sec. 207. Water from shallow, muddy, brackish, or marshy sources shall not be used.

All other sources shall be approved before using, and a one pint (0.5 liter) sample in a glass or plastic jar shall be submitted to the District or Central Office Laboratory for tests. Samples of water should not be taken from a pond or stream while they are at flood stage.

When necessary to take samples of water for environmental studies, rest areas, including their effluent water, or for other purposes, the Central Office Chemistry Laboratory should be contacted to determine the details of sampling and tests required.

Samples of water shall be packed and marked, in accordance with Sec. 203, using Form TL-11, as outlined in Sec. 800.

Information should be given on the card to show whether the water has been taken from a pond, flowing stream, or other source. Laboratory tests of water will be reported on Form TL-47 and/or TL-33, as outlined in Sec. 800.

Sec. 204.35 Waterproofing and Dampproofing Materials

(Sec. 213) See Sec. 207 for waterproofing materials that may be approved on modified inspection.

(a) Asphalt and Primer

Asphalt and primer shall be sampled the same, as outlined for asphalt material in Sec. 204.05. The size of sample shall be one quart (one liter) of each. One drum lots or less may be accepted on modified inspection, as outlined in Sec. 207.

(b) Fabric

Bituminous saturated cotton fabric and glass fiber shall be sampled by cutting a piece one ft. (0.3 m) long by full width for each shipment. This sample shall be submitted to the Central Office Laboratory in a packaging envelope and marked, in accordance with Sec. 203, using Form TL-10, as outlined in Sec. 800.

(c) Joint Sealers

Horizontal joint sealers shall be sampled the same, as outlined in Paragraph (a) above. The size of sample shall be one quart (one liter). Modified inspection procedure is the same, as outlined in Paragraph (a).

(d) Waterproofing Membranes

Waterproofing membranes, consisting of Systems A, B, C, D, or E of various combinations of primer, mastic, prefabricated laminated membranes of various types, and/or elastomeric expansion films, shall be approved on Manufacturers' certifications. These will require no sampling or testing, and may be accepted on modified inspection, as outlined in Sec. 207.

(e) Reports

Laboratory tests of all waterproofing and dampproofing materials will be reported on Form TL-43, except fabric, which will be reported on Form TL-47. Inspections will be reported on Form TL-109. See Sec. 800 for details.

Sec. 204.36 Wire Rope and Wire Strand

A sample of wire rope shall consist of a piece 10 ft. (3 meters) long and a separate piece 2 ft. (0.6 m) long cut from each spool or coil by means of a hacksaw. Before cutting, the wire rope should be seized on each side of the place where the rope is to be cut. The length of the seizing should be at least the diameter of the wire rope. Any annealed low carbon steel wire of approximately 0.100 in. (2.5 mm) diameter may be used for seizing.

Zinc-coated steel wire strand, for use as span or guy wire for traffic signals or other types of electrical systems, shall be sampled as follows. One sample 6 ft. (2 m) in length, shall be taken from each lot of 5000 ft. (2000 m) or less. For lots of from over 5000 ft. (2000 m) to 30,000 ft. (10,000 m), 2 samples shall be taken; for lots of from over 30,000 ft. (10,000 m) to 150,000 ft. (50,000 m), 3 samples shall be taken; for lots of over 150,000 ft. (50,000 m), 4 samples shall be taken. If a sample fails on first test, 2 additional tests will be made on samples from the same coil or reel. If either of these tests fails, then the lot will be rejected. See Sec. 207 for additional details for acceptance of traffic signal and other electrical components and appurtenances on modified inspection.

All samples shall be wrapped securely and forwarded to the Central Office Laboratory for examination. Form TL-10, filled out in accordance with Sec. 800, should accompany the sample to the Laboratory. Laboratory tests of wire rope and strand will be reported on Form TL-25, as outlined in Sec. 800.

SECTION 205 SUMMARY OF MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

Tabulated herein is a schedule of the minimum requirements for acceptance sampling and testing of materials by project or plant personnel and the District or Central Office Laboratory. Although project personnel may not be required to test a material, their aid may be enlisted to obtain

representative samples for the District or Central Office Laboratory, provided that they are qualified to take samples of the particular material. Sampling shall be conducted, as outlined in Sec. 204.

Where the location for sampling is shown to be the source, and the material arrives at the job site prior to being sampled, then the same rate of sampling is required at the job site as at the source, and only qualified personnel will be permitted to take this sample.

Where modified inspection is called for, the instructions in Secs. 109.03, 110, and 207 will govern, and the Project Inspector must examine the material for cleanliness, uniformity, and freedom from cracks, flaws, and apparent defects.

Rates given herein are the minimums considered desirable to provide effective control of materials under ideal conditions. When conditions are otherwise, the number of samples and tests should be established as deemed necessary to attain the uniformity and level of workmanship intended by the specifications.

The initial testing should be established at a substantially greater frequency than minimum by the Engineer, until he is satisfied that the type of material and the Contractor's equipment and procedures can consistently produce a finished product well within the specification. At this point, the testing frequency may be progressively reduced, if the test results continue to show uniformly good material and workmanship, until minimum frequency is reached. If a failing sample or test is noted, the testing frequency should be increased, as the process is adjusted, until found to be satisfactory. The frequency of sampling and testing should be flexible enough to assure acceptable construction, reflecting changes in the performance of the Contractor's operations.

Contact the District Materials Engineer for instructions in sampling any new or miscellaneous materials not listed herein.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
1. Admixtures, Concrete...	215	Visual. Approved on certified analysis and placed on annual list, after submission of an initial one pint (0.5 L) sample with independent lab. test data.			Trial mixes are suggested before using new admixtures or changing ingredient in satisfactory mixes. See Sec. 207 for modified acceptance and Sec. 209, Appendix, for approved list. Initial and subsequent random samples subjected to I/R scan and compared.
2. Aggregates - (a) Any Type, Other Than Dense Graded, Central-Mixed, Type I, Select Material or Any Type Sub-base or Base Material - (1) Grading...	See Specs.	One 10 lb. (5 kg) sample (F.A.) or 30 lb sample (15 kg) (C.A.) per size per 1000 tons (1000 metric tons), or as directed by District Materials Engineer, to be tested by Producer; supplemented by one monitor sample per week or one per month per size (produced, to be tested in the District or Central Office Laboratory.	At source.	Secure container or sample bag free of contaminants, if shipped to another laboratory. Ship fine sizes in tight container or closely woven bag.	Aggregate Producers responsible for sampling and controlling product for grading. Aggregate may be accepted at job site with certification from Producer stating that required tests have been performed and have met specification requirements for the material. Open graded aggregates for hydraulic cement concrete are to be sampled once per month at the ready-mix concrete plant when production exceeds 100 cubic yards (100 cubic meters) per month to monitor shipping and stockpiling requirements. Open graded aggregate, for hydraulic cement concrete, when used in sign islands, sign footings, culvert joint mortar, or other small incidental items, in quantities of 50 tons (50 metric tons) or less per size per project require no testing. See Sec. 207 for acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(2) Quality....		One 40 lb. (20 kg) sample per size (F.A., #8 & #57 C. A., etc.) biennially to District Laboratory.	At source.	Same as Item 2(a)(1).	See Quality Lists in Sec. 209, Appendix.
(b) Dense Graded, Central- Mixed, Type Material and All Types Subbase and Base Material	207 & 208.	See Sec. 300.	See Sec. 300.	See Sec. 300.	See Sec. 300.
3. Aluminum Alloys..	229	Visual. Approved on certified physical and chemical analyses.			Coating for aluminum in contact with concrete will be sampled the same as outlined in. Sec. 204.24. Aluminum sign blanks occasionally checked for dimensional requirements. See Sec. 207 for modified acceptance.
4. Bearing Pads and Bedding Materials- (a)Elastomeric Bearing Pads.	237	Two (2) pads full size each thickness per shipment of 300 pads or less. One additional pad per each additional 300 pads, or fraction thereof. Submit to Central Office Laboratory.	From source or job site.	Packaging envelope.	
(b) Preformed Fabric Bedding Material.	237	Same as Item 4(b).	Same as Item 4(a).	Same as Item 4(a).	

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(c) Sheet Lead and Common Desilverized Lead Bedding Material.	237	Visual. No sampling required.			See Sec. 207 for modified acceptance.
5. Asphalt Materials Liquid.	210	Control sampling and testing to be done by manufacturer per approved sampling control plan. Monitor sampling to be one sample per month during construction season, with lesser frequency the rest of the year.	At point of manufacture. Monitor samples and IAS samples to be split samples with the control sample.	Double top cans, oblong cans with screw tops, or small mouth cans with screw caps for liquid material. Wide mouth jars or bottles made of plastic or glass, NEVER METAL CONTAINERS, for emulsified asphalt.	Quality control testing will be performed by the manufacturer, or a VDOT approved commercial laboratory. Quality assurance testing will be performed by VDOT's Central Laboratory. Manufacturer will certify all materials shipped on the shipping documents, and maintain records of lots represented by test results. Copies of test results will be sent to the Central Laboratory. The recipient of the materials shall maintain copies of the shipping documents for twelve months, and have available for VDOT verification.
6. Asphalt Mixtures..	211.	See Sec. 500.	See Sec. 500.	See Sec. 500.	See component materials and Secs. 204.02, 204.05, and 500 herein. See Sec. 206 for Independent Assurance Sampling.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
7. Brick...	222	Ten (10) brick for each 50,000 lot, or fraction thereof; and 5 brick from each 100,000, or fraction thereof, for lots of more than 500,000 but not less than 10. Submit to District or Central Office Laboratory. and 5 brick from each 100,000, or fraction thereof, for lots of more than 500,000 but not less than 10. Submit to District or Central Office Laboratory.	At source or delivery point.	No container necessary.	Brick in orders of 1000 or less may be accepted on modified inspection. See Sec. 207.
8. Bronze and Copper Alloy...	230.	Visual. Approved on certified physical and chemical analyses.			See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
9. Cement, Hydraulic..	214	Visual. Approved on Manufacturer's certification supplemented with check testing Check sample of one gal. (4 L) (20 lbs.) (10 kg) for each 5000 yd ³ (5000 m ³) of concrete per project, or one per project for cement stabilization work in excess of one mile (2 km), regardless of number of lanes. Projects having less than 500 yd ³ (500 m ³) of concrete, or less than one mile (2 km) of stabilization work require no sampling. Submit to Central Office Laboratory.	At ready-mix plant, batch plant, or job site.	Airtight, moisture proof glass or metal container. One 1.0 gal. (4 L) container or two 0.5 gal. (2 L) container sufficient.	See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
10. Chloride Salts (a) Sodium..	239	One qt. (1 L) per 2000 tons (2000 metric tons) to Central Office Laboratory. In cases of low tonnages and with permission of State Materials Engineer, one sample per District per supplier would be sufficient. When source inspection is impractical or shipment is made from uncovered storage, one sample per 1000 tons (1000 metric tons) will be taken at time of delivery.	At source from con-tainer or stockpiles of indoor storage, or otherwise, at destination at time of delivery.	Airtight, moisture proof metal or glass container.	Shipments subject to visual inspection at destination prior to unloading. Any shipment deemed to be unusable, due to excessive water or oversized material, may be rejected. Sample may be taken for moisture test.
(b) Calcium..	239	One qt. (1 L) per order per District.	Same as Item 10(a).	Same as Item 10(a).	Same as Item 10(a).
11. Concrete Hydraulic Cement	217	See Sec. 400.	See Sec. 400.	See Sec. 400.	See component materials and Sec. 400 herein. See Sec. 206 for Independent Assurance sampling.
12. Copper Sheet and Strip..	230	Visual. No testing or certification required.			See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
13. Curing Materials Protective Coatings for Concrete (a) Curing Materials -					
(1) Liquid Membrane Seal..	220	One qt. (1 L) per lot, batch, or other unit of production, but no less than one qt. (1 L) per 2000 gal. (8000 L) to Central Office Laboratory.	At source or job site.	Metal container, properly capped.	
(2) Burlap and Poly-ethylene Sheeting....	220	One sheet 4 ft ² (1 m ²) or width of roll per lot or other unit or production per shipment to Central Office Laboratory.	Same as Item 13(a)(1).	Packaging envelope.	
(3) Poly-ethylene Sheeting.	220	Same as Item 13(a)(2).	Same as Item 13(a)(1).	Same as Item 13(a)(2).	
(4) Water-proof Paper.	220	Same as Item 13(a)(2).	Same as Item 13(a)(1).	Same as Item 13(a)(2).	
(5) Mono- molecular Film..		Visual. No testing or certification required.			See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(b) Protective Coatings - (1) Silicone Treatment.	404.03	One qt. (1 L) per job to Central Office Laboratory.	At source or job site.	Clean, airtight metal or glass container.	
(2) Spray-On Surface Finish.		Visual. Placed on approved List. No sampling required.			See Sec. 207 for modified acceptance.
14. Electrical Conduits, Fittings, and Boxes - (a) Acrylonitrile-Butadiene-Styrene (ABS) Conduit and Fittings.	238 and 705.	One full length conduit per size diameter per shipment to Central Office Laboratory.	At source or job site.	No container necessary.	Fittings accepted on modified inspection and require no testing or certification, provided made of same or equivalent material as the conduit. See Sec. 207.
(b) & (c) Previously Asbestos-Cement & Bituminous Fiber Conduit and Fittings.					
(d) Metal Conduit and Fittings...		Two (2) pieces, one from each end of one length of conduit, each 8 in. (200 mm) in length, per size diameter per shipment to Central Office Laboratory.	Same as Item 14(a).	Same as Item 14(a).	Samples to be sawed true from ends of lengths picked at random. Fittings accepted on modified inspection, upon receipt of Manufacturer's certified analysis of test report, including zinc content. See Sec. 207.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(e) Plastic and Poly (Vinyl Chloride) (PVC) Conduit and Fittings..		Approved on Manufacturer's Certification and visual inspection to determine that each section contains letters "UL". No sampling or testing required.			See Sec. 207 for modified acceptance.
(g) Boxes		For concrete junction boxes, 2 - 6 x 12 in. (150 x 300 mm) or 3 - 4 x 8 in. (100 x 200 mm) cylinders on random basis. For metal junction boxes, thickness of coating tested as in corrugated steel pipe. All other boxes visual, and no testing or certification required.			See Sec. 207 for modified acceptance.
(h) Other Electrical Components...		Usually accepted on Manufacturer's Certifications, catalog cuts and/or by Pre- Approved Traffic Control Device Listing, in the case of some traffic control equipment.			See Sec. 207 for modified acceptance. For acceptance of electrical system structural elements, see individual sections for component materials.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
15. Epoxy Resins..	212, 223, & 243	One qt. (1 L) of lesser component and enough of large component for mixing per lot or shipment to Central Office Laboratory. Epoxy loop sealants for traffic signal sampled same.	At Source or job site.	Each component shipped in separate clean can. See Sec. 204.15 for information to be labeled on cans.	Contents of each component being sampled should be mixed thoroughly before sampling. When quantity is 15 gals. (60 L) or less for any one project, epoxy may be accepted on Manufacturer's certification. See Sec. 207 for modified acceptance. Powdered epoxy resins are accepted by an approved list. See Sec. 209, Appendix.
16. Fencing - (a) Chain-Link Fencing....	242	One sample from each of 3 roles from each 50 rolls, or fraction thereof, per shipment, consisting of one woven length including at least 6 vertical wires full width top to bottom, taken from end of each roll sampled, to Central Office Laboratory. Rods, Fittings, and gates accepted on modified inspection, and require no sampling.	At source or job site.	All Fencing samples rolled into tight roll and tied securely, exercising care not to bend or kink wires.	If Contractor secures any fencing directly from source, properly identified and tagged, Department may test at source. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(1) Tension Wire		One 3 ft. (1 m) strand from end of one spool from each 50 spools, or fraction thereof, per shipment to Central Office Laboratory.	Same as Item 16(a).	Same as Item 16(a).	Same as Item 16(a).
(b) Standard Fencing - (1) Barbed Wire		Same as Item 16(a)(1). Rods, fittings, and gates accepted on modified inspection, and require no sampling.	Same as Item 16(a).	Same as Item 16(a).	Same as Item 16(a).
(2) Lawn....		Visual. No sampling required.			See Sec. 207 for modified acceptance.
(3) Woven Wire and Brace Wire.		One 2 ft. (0.6 m) length of woven fence, full width, or one 2 ft. strand (0.6 m) of brace wire, from end of one roll from each 50 rolls, or fraction thereof, per lot per shipment to Central Office Laboratory. Rods, fittings, and gates, and farm fence to replace old, or damaged fence to be reset, accepted on modified inspection, and require no testing.	Same as Item 16(a).	Same as Item 16(a). Woven wire may be folded and placed between 2 pieces of cardboard.	Same as Item 16(a).

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(c) Miscellaneous Fencing - (1) Snow Fence. (2) Wood, Treated		One 2 ft (0.6 m). x full width per 100 rolls per shipment to Central Office Laboratory. Visual. No samples required on project.	Same as Item 16(a).	Same as Item 16(a). Projecting wire turned inwardly before rolling.	Sample shall be cut from end of roll that includes 12 in. (300 mm) length of untwisted wire. Usually, preservative, penetration and retention approved at point of treatment. See Secs. 204.29 and 204.33.
(d) Posts....		See Item 28. herein.			
17. Fly Ash	241	One 5 lb. (2.5 kg) sample per project for soil stabilization to Central Office Laboratory. For ready- mix concrete use, one gal. (4 L) each fly ash and cement, with which it will be used to Central Office Laboratory. Also, for ready-mix concrete use, one qt. (1 L) of fly ash per shipment to ready-mix plant, to Central Office Laboratory for physical properties.	At source, job site, or ready- mix concrete plant.	Clean can or jar.	Semi-annual quality tests will be performed for each source, after initial approval. Sample size same as initial sample.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
18. Guardrail, Beam....	Steel 221	Visual. Approved on certification supplemented with check testing. Check sample of 2 ft. (0.3 m) of beam (no bolts or washers) each 6 months per District to Central Office Laboratory.	At source or job site.	No container necessary.	
19. Joint Materials -	212				See Sec. 207 for joint materials that may be accepted on modified inspection.
(a) Elastomeric Expansion Dam...		Visual. Accepted on Manufacturer's certification and certified independent laboratory materials test results.			Structural steel, aluminum, and anchor bolts accepted on mill analyses. See component materials elsewhere herein.
(b) Expanded Rubber Joint Filler.....		One ft ² (0.1 m ²) x full thickness per lot or shipment each thickness to Central Office Laboratory.	At source or job site.	Loose or in packaging envelope.	
(c) Hot-Poured Joint Sealer..		One 10 lb. (5 kg) piece per shipment or lot to Central Office Laboratory.	Same as Item 19(b).	Wrapped in paper, boxing unnecessary.	DO NOT TAKE SAMPLE FROM HEATING KETTLE.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(d) Poly (Vinyl Chloride) (PVC) and Polyethylene Joint Fillers..		One section 2 ft. (0.6 m) x full depth and thickness per 1000 ft ² (100 m ²) or less, each thickness and type or brand, to Central Office Laboratory.	Same as Item 19(b).	Boxed or securely tied to piece of board. NEVER USE NAILS TO FASTEN SAMPLE.	
(e) Preformed Chloroprene Seal....		Same as Item 19(b).	Same as Item 19(b).	Same as Item 19(b).	
(f) Preformed Elastomeric Joint Sealer....		One piece 2 ft. (0.6 m) x full thickness per lot or shipment, each thickness or size, to Central Office Laboratory.	Same as Item 19(b).	No container necessary for sealer.	
(g) Preformed Joint Filler (Bituminous Types)		Same as Item 19(d).	Same as Item 19(b).	Same as Item 19(d).	
(h) Pressure Joint Relief Material...		One piece one ft. (0.3 m) per size per lot to Central Office Laboratory.	Same as Item 19(b).	No packaging necessary.	
(i) Pipe Gaskets...		Two (2) complete gaskets per shipment or lot to Central Office Laboratory.	Same as Item 19(b).	No container necessary.	

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(j) Sponge Rubber Joint Filler...		Same as Item 19(d) Same rate required if used in bridge bearing.	Same as Item 19(b).	Same as Item 19(d).	
(k) Waterstops...		One piece one ft. (0.3 m) per size per lot to Central Office Laboratory.	Same as Item 19(b).	No packaging necessary.	Sheet copper metal waterstops accepted on modified inspection, as outlined in Sec. 207.
(l) Silicone...		Visual accepted on approved list of Materials Division.			See Sec. 207 for modified acceptance.
20. Landscape Materials (Roadside Development) (a) Fertilizer..	244	Visual. Accepted on certification by furnishing Form of Affidavit.			See Sec. 207 for modified acceptance.
(b) Herbicides..		Visual. Verification of Manufacturer's container label for composition, brand, etc.			
(c) Lime....		Same as Item 21(a).	Same as Item 21(a).	Same as Item 21(a).	

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(d) Mulch...		Visual. Approval is based on semi-annual source/inventory sampling program and approved sources listed by Materials Division. See details in Sec. 204.20(d).			See Sec. 207 for modified acceptance and Sec. 209, Appendix, for approved list.
(e) Seed....		Same as Item 20(a).			See Sec. 207 for modified acceptance.
(f) Filter Cloth Fabric...		One piece 10 ft. (3 m) x full width to Central Office Laboratory, together with Manufacturer's certification ultraviolet ray inhibitors and stabilizers, and burst strength, where applicable.	At source or job site.	No packaging necessary.	
21. Lime - (a) Agricultural	240	One qt. (1 L) per project grading test to District Laboratory.	At source or job site.	Closed, airtight metal container.	Calcium carbonate equivalent determined from Department of Agriculture list of suppliers. If in doubt or source not listed, sample for this test submitted to Central Office Laboratory. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(b) Hydrated..	240	Visual. Approved on Manufacturer's certification, except from new source, which requires a one qt. (1 L) sample to Central Office Laboratory.	At delivery point.	Same as Item 21(a).	See Sec. 207 for modified acceptance.
(c) Hydraulic..	240	Same as Item 21(b).	Same as Item 21(b).	Same as Item 21(b).	Same as Item 21(b).
22. Masonry Units, Concrete - (a) Wall Units...	222	Ten (10) whole units for lots of 10,000 units, or fraction thereof. Twenty (20) whole units per 10,000 to 100,000 units. Ten (10) whole units per 50,000 units, or fraction thereof, for lots of more than 100,000 units. Submit to District or Central Office Laboratory.	At source or job site.	No container necessary.	When shipment contains block of various sizes, do not duplicate size of sample for each size block.
(b) Catch Basins and Manholes..	222	Same as Item 22(a).	Same as Item 22(a).	Same as Item 22(a).	At least 1/2 of number of units in sample MUST BE BARREL BLOCKS.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(c) Miscellaneous Precast Units..	222	Three (3) cylinders from one casting selected on random basis, or 2 cores per lot size, to District or Central Office Laboratory. On temporary barriers shipped from project, Contractor provides certification that units inspected and approved when initially shipped.	At source.	Cylinders or cores packed in closed curing cans containing saturated sponges, or in substantial boxes containing saturated sawdust or wood chips.	See component materials and concrete control tests in Sec. 400.
23. Monuments, Right of Way...	219 and R.D.& S. -RM-2.	Normally tested and stamped at plant. If received untested or made on the job, one whole monument to be submitted to District or Central Office Laboratory. For RM-2 monuments, one whole cadmium plated brass or stainless steel cap per project to Central Office Laboratory.	See previous column.	No container necessary for monuments. Packaging Envelope for brass or steel caps.	For RM-2 monuments, steel pins and U-type galvanized rolled rail steel or aluminum alloy locator posts accepted on visual inspection and require no testing or certification. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
24. Paint (a) Bridge	231	One qt. (1 L), System A, AA, each type per lot or batch to Central Office Laboratory. Systems B and F accepted on approved list.	At source or job site.	Clean, wide mouth metal cans.	Aluminum paste and varnish sampled separately. Paint in quantities of 20 gals. (75 L) or less per project accepted on modified inspection. See Sec. 207. See Sec. 209, Appendix, for approved lists.
25. Piling - (a) Concrete: Cast-in-Place, Precast, or Prestressed...	217	See Sec. 400.	See Sec. 400.	See Sec. 400.	See component materials and Sec. 400 herein.
(b) Steel, H-Beam	228	Visual. Approved on Manufacturer's mill analysis. No sampling or mill inspection required.			See Sec. 207 for modified acceptance.
(c) Steel, Sheet...	228	Same as Item 25(b).			See as Item 25(b).
(d) Steel, Shell...	228	Same as Item 25(b).			Same as Item 25(b).
(e) Timber...	236	Requires no testing or certification, but does require shop inspection. See remarks			Preservative and treatment approved at point of treatment See Secs. 204.29 and 204.33. Untreated timber piling accepted on modified inspection. See Sec. 207.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
26. Pipe -	232				When quantity of any approved type of <u>culvert</u> pipe is 50 ft. (15 m) or less per project, culvert may be accepted on visual inspection. See Sec. 207 for additional details of modified acceptance of pipe. See Sec. 204.26(n) for acceptance of pipe used in municipal sewer and water lines. Culvert pipe used in rest area and landscape contracts sampled and tested same as for any other project.
(a) Acrylonitrile - Butadiene - Styrene (ABS)...		One piece 2 ft. (0.6 m) x full section from one pipe length each size per shipment to Central Office Laboratory.	At source or site.	Ship loose, no packing necessary.	
(b) & (c) Previously Asbestos Cement & Bituminous Fiber					
(d) Cast Iron...		Visual. Approved on Manufacturer's certification.			See Sec. 207.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(e) Clay....		One pipe joint equal to 0.5% of total number of pipes each size per day, minimum of one specimen per size. See Remarks.	Strength tests usually performed at plant. Absorption samples submitted to District or Central Office Laboratory.	Same as Item 26(A)	One complete pipe joint for strength tests. One full thickness section from wall of pipe, 12 to 20 in ² (7500 to 15,000 mm ²) in surface area, for absorption tests. Absorption sample taken from same pipe specimen found acceptable in strength requirements.
(f) Concrete - (1) Plain (Nonreinforced), Perforated, and Porous.....		One per lot as defined in Section 204.26 (f)(1)	Strength and absorption testing performed by producer as outlined in Section 204.26(f)		Accept on manufacturers certification of conformance with VDOT QC/QA program. Certification to be stamped on shipping ticket.
(2) Reinforced (Circular or Elliptical)...		Same as 26(f)	Same as 26(f)		Same as 26(f)
(g) Corrugated Aluminum Alloy.....		Visually accepted by the project inspector based on Corrugated Metal Pipe Quality Assurance Program as outlined in Section 204.26(g) & (h)			

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(h) Corrugated Steel, Coated..		Same as Item 26(g)	Fabrication Plant per Section 204.26(h)	Quality Assurance Samples submitted to Central Office Laboratory stacked, wrapped and tied securely..	If bituminous coating is used on pipe, samples of the bitumen will be sampled separately at the dip tank and submitted to the Central Office Laboratory in accordance with the Quality Assurance Plan.
(i) Glass Fiber Reinforced Epoxy Pipe and Fittings		Same as Item 14(c).	Same as Item 26(a).	No container necessary.	
(j) Polyethylene (PE) Corrugated...		One sample of a length equal to 5 diameters per lot, lot not to exceed 5000 ft. (1500 m), for culvert pipe. One 5 ft. (1.5 m) sample per lot, lot not to exceed 10,000 ft. (3000 m), for underdrain, to Central Office Laboratory.	Same as Item 26(a).	Same as Item 26(a).	

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(k) Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings...		One piece minimum 3 ft. (1 m) x full section from one pipe length each size per shipment. Fittings accepted on modified inspection and require no testing or certification, as outlined in Sec. 207. Semiround PVC plastic underdrain pipe with top shield shall be sampled by cutting one piece minimum 2 ft. (0.6 m) x full section from one pipe length each size per shipment. Samples submitted to Central Office Laboratory.	Same as Item 26(a).	Same as Item 26(a).	
(l) Seamless Steel, Black & Galvanized...		Same as Item 14(d), except black seamless steel pipe only requires one sample 22 in. (0.6 m) in length, cut from one end of one pipe length, per size diameter per shipment, to Central Office Laboratory. See Remarks.	Same as Item 26(a)	Same as Item 26(a).	Same as Item 14(d). Smooth wall steel pipe used for jacking accepted on Manufacturer's certification, together with physical and chemical analyses, and requires no sampling or testing. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(m) Structural Plate Pipe, Pipe- Arches, and Arches.		Visual. Accepted by Project Inspector from Manufacturer's and Fabricator's certificates and guarantees, and mill analysis. Fabricator also furnishes Certificate of Compliance for each shipment and each project. (Normally included on delivery ticket.)	Same as Item 26(g).		See Sec. 204.26(m) for details.
27. RESERVED -					
28 Poles & Posts -					
(a) Fence, Chain- Link- (1) End, Corner and Gate Posts and Braces....	242	One whole post per 500 posts, or fraction there-of, per shipment to Central Office Laboratory.	At source or job site.	No container necessary.	Aluminum alloy pipe fence posts approved on Manufacturer's certified physical and chemical analyses and require no sampling. See Sec. 207 for modified acceptance.
(2) Line Posts and Braces...		One whole post per 500 posts, or fraction there-of, per shipment to Central Office Laboratory.	At source or job site.	No container necessary.	Aluminum alloy pipe fence posts approved on Manufacturer's certified physical and chemical analyses and require no sampling. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(b) Fence, Standard (1) Metal Posts and Braces....	242	Same as Item 28(a)(1). Posts for snow fence and miscellaneous small signs accepted on modified inspection, since no testing or certification required.	At source or job site.	No container necessary.	
(2) Wood Posts and Braces (Treated).....	236	Visual. Normally, no samples required on project. See Remarks.			Preservative and treatment usually approved at point of treatment. See Secs. 204.29 and 204.33. Locust posts require no treatment, testing, or certification. See Sec. 207 for modified acceptance.
(c) Guardrail - (1) Concrete Posts.....	217	Three (3) cylinders, 4 x 8 in. (100 x 200 mm), per day during fabrication to District or Central Office Laboratory.	At fabrication point.	Same as Item 22(c).	See component materials and Sec. 400 herein.
(2) Steel Posts.		Visual. Approved on Supplier's or Erector's certification, same as Item 18, supplemented with check testing. Check sample of one whole post and offset block each 6 months per District, normally taken at project, to Central Office Laboratory.	At source or job site.	Same as Item 28(a).	See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(3) Wood Posts.		Same as Item 28(b)(2).			Same as Item 28(b)(2).
(d) Lighting Standards, High Mast Lighting Standards, Luminaires, Mast Arm Poles, Combination Mast Arm - Luminaire Arm Poles, Pedestal Poles, and Other -	705.02				
(1) Aluminum...		Accepted on modified inspection with Manufacturer's certification. If poles subject to alloy specifications. Manufacturer's certified physical and chemical analysis also required. Also applies to aluminum alloy breakaway support couplings.			See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(2) Steel.....		Same as Item 28(d)(1). Includes steel shafts and base flanges for high mast lighting standards.			Same as Item 28(d)(1). See Sec. 204.32 for additional details of modified acceptance.
(e) Traffic Sign - (1) Aluminum Alloy Poles and Break-away Supports	701.02	Approved on Manufacturer's certified physical and chemical analyses.			See Sec. 207 for modified acceptance.
(2) Galvanized Steel Sign Poles and Posts....		Approved on Manufacturer's mill analysis and shop inspection.			See Secs. 204.32 and 207 for details of modified acceptance. if poles are painted, paint shall be accepted as outlined in Sec. 204.24.
(3) Rolled Rail Steel Poles and Posts...		Same as Item 28(e)(2).			Same as Item 28(e)(2).
(4) Structural Steel Poles and Posts....		Same as Item 28(e)(2).			Same as Item 28(e)(2).
(5) Treated Wood Poles and Posts....		Same as Item 28(b)(2).			Same as Item 28(b)(2).
(f) Traffic Signal - (1) Steel Poles.	703, 226, 236	Same as Item 28(e)(2).			Same as Item 28(e)(2).
(2) Treated Wood Poles.....		Same as Item 28(b)(2).			Same as Item 28(b)(2).

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
29. Preservatives, 236 Timber..		One qt. (1 L) per treatment of State work to Central Office Laboratory. See Remarks. Sample same as "Asphalt" in Sec. 204.05(b)(1).	At treatment point only from charge tank.	Metal container with secure top.	If consecutive treatments used on State work, one sample may represent more than one charge, but must be resampled after 5 consecutive treatments.
30. Reflective 234 Materials - (a) Glass Beads.		One qt. (1 L) composite sample per lot per shipment to Central Office Laboratory.	At point of Manufacture or job site.	Packed securely in sturdy box with excelsior or other cushioning material to prevent loss of beads.	
(b) Reflect-orized 246 Pavement Markings		No sampling in field required. Material normally presampled and pretested.			
(c) Traffic Paint		Traffic paint to be accepted on certification of acceptable test by VDOT.			

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(d) Permanent Pavement Markings		Permanent Pavement Markings to be accepted similar to Traffic Paint. Preformed Tape Accepted on Certification and Approved List.			
(e) Retro-Reflective Sheeting...	701	Encapsulated lens type requires no field sampling. Accepted on Manufacturer's certification, based on prior 2-yr. laboratory/field evaluation.			See Sec. 207 for modified acceptance.
(f) Retro- Reflectors....	235	Field sampling not required. Usually presampled by Materials Division.			
31. Soils and Granular Materials..	207 & 208	See Sec. 300.	See Sec. 300.	See Sec. 300.	See Sec. 300. See Sec. 206 for Independent Assurance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
32. Steel -					
(a) Castings, Forgings, and Shafting...	224 & 225	Visual. Approved on Manufacturer's certified physical and chemical analyses of tests conducted at point of manufacture, except gray-iron castings, which are sampled by Plant Inspector and submitted to Central Office Laboratory.	At source, for gray-iron castings.	No container necessary.	See Sec. 207 for modified acceptance, and also for exceptions in cases where cast steel and cast iron (gray) are used in rest area construction.
(b) Grid Flooring...	223	Same as Item 32(a).			See Sec. 207 for modified acceptance.
(c) Misc. Metals (Timber Connectors)...	223	Same as Item 32(a).			Same as Item 32(b).
(d) Prestressing Tendons.....	228	Two (2) pieces each 6 ft. (2 m) x full diameter per each 7 coils to Central Office Laboratory.	At prestress casting yard.	Attached securely with wire or nails to straight rigid object, such as board. DO NOT TIE STRAND OR WIRE IN A TIGHT CIRCULAR LOOP.	

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(e) Reinforcement- (1) Bars, Plain and Deformed....	228	Approved on Fabricator's certification. Certification to state domestic material, and compliance to specified grade and designation. If epoxy coated an additional certification stating coating complies with AASHTO M284 and coating material is on VDOT approved list. Project inspector to sample 2 pieces (one sample) from the most prevalent bar size per structure, with no two samples being the same size. Each piece is to be 24 inches (0.6 m) long.	At source and job site.	Fastened together securely.	Bars must be sawed or cut, not burned through. See Sec. 206 for Independent Assurance sampling.
(2) Bars, Longitudinal, for Continuous Reinforced Concrete Pavement....		Same as Item 32(e)(1), except monitor sample to be taken by project inspector at one sample per 2 lane miles (3 lane kilometers).	Same as Item 32(e)(1).	Same as Item 32(e)(1).	Same as Item 32(e)(1).

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(3) Bar Mat...		Approved on modified inspection, and requires no sampling.			See Sec. 207 for modified acceptance.
(4) Spiral Wire.		Same as Item 32(e)(1).	Same as Item 32(e)(1).	Same as Item 32(e)(1).	Same as Item 32(e)(1).
(5) Structural Steel...		Same as Item 32(e)(1).	Same as Item 32(e)(1).	Same as Item 32(e)(1).	Same as Item 32(e)(1).
(6) Welded Wire Fabric....		Same as Item 32(e)(1). except one piece 3 x 3 ft. (1 m ²) per project if quantity exceeds 75,000 ft ² (7000 m ²), as monitor to Central Office Laboratory.	Same as Item 32(e)(1).	Securely tied flat between 2 pieces of corrugated cardboard.	
(7) Supports for Reinforcing Steel		Accepted by Manufacturer's or Supplier's certification letter and visual inspection. If certification unavailable or if in doubt, submit one bar support per type and Manufacturer to Central Office Laboratory. See Remarks.	At source or job site, if sampling necessary.	No container necessary.	See Sec. 204.32(e)(7) for additional details of visual inspection of coating.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
(f) Structural..	212, 226, 701, 703, & 705	For stainless steel and bimetallic anchor bolts, one whole bolt per shipment to Central Office Laboratory. Remainder accepted on modified inspection with Plant inspector submitting Manufacturer's mill analysis, fabrication inspection reports and Fabricator's Certificate of Compliance, as required.	Bolts at source.	No container necessary.	See Secs. 204.32(f)(2) and 207 for additional details of modified acceptance of structural steel items.
33. Structural Timber and Lumber....	236	Accepted on modified inspection. No samples required. See Remarks.			Penetration and retention of treatment is determined at point of treatment, as outlined in Sec. 246, Road and Bridge Specs. Preservative is sampled at point of treatment, as outlined in Sec. 204.29 herein. See also Sec. 207 for modified acceptance.
34. Water	216	One pint (0.5 L) per source to District or Central Office Laboratory. (Approved drinking water requires no sampling.)	At source.	Glass or Plastic jar.	Do not secure samples at flood stage. Shallow, muddy, brackish, or marshy sources shall not be used. If necessary to sample water for environmental studies, rest areas, etc., contact Central Office Chemistry Laboratory for instructions. See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
35. Waterproofing and Dampproofing Materials -					See Section 207 for Modified Acceptance details.
(a) Asphalt Primer.....	and 213	One qt. (1 L) of each, same as Item 5, to Central Office Laboratory.	At source or job site.	Same as Item 5.	One drum lots or less accepted on modified inspection. See Sec. 207.
(b) Fabric...	213	One piece 1.0 ft (0.3 m) . x full width per shipment to Central Office Laboratory.	Same as Item 35(a).	Packaging envelope.	
(c) Joint Sealers..	213	Same as Item 35(a).	Same as Item 35(a).	Same as Item 5.	Same as Item 35(a).
(d) Waterproofing Membranes...	213	Accepted on modified inspection and Manufacturer's certification. Requires no sampling or testing.			See Sec. 207 for modified acceptance.

MINIMUM ACCEPTANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	ROAD AND BRIDGE SPECIFICATION REFERENCE	RATE OF SAMPLING	LOCATION FOR SAMPLING	PROPER CONTAINER AND PACKING	REMARKS
36. Wire Rope and Wire Strand...		For wire rope, one piece 10 ft. (3 m) long and one piece 2 ft. (0.6 m) long. For zinc-coated wire strand, one piece 6 ft. (2 m) per lot of 5000 ft. (2000 m) or less, 2 pieces per lot of 5000 to 30,000 ft. (2000 to 10000 m), 3 pieces per lot of 30,000 to 150,000 ft. (10000 to 50000 m), and 4 pieces per lot of more than 150,000 ft (50000 m). For failing samples, 2 additional tests will be made on samples from same coil or reel. If either fails, lot is rejected. All samples submitted to Central Office Laboratory.	At source or delivery point.	Wrapped securely and ends seized.	See Sec. 207 for modified acceptance of traffic signal and other electrical components and appurtenances.

SECTION 206 SUMMARY OF MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

Sec. 206.01 Definitions

Quality Control (QC) – also called “process control”. Those actions and considerations necessary to assess production and construction processes so as to control the level of quality of the end product. This concept of quality control includes sampling and testing to monitor the process in addition to acceptance sampling and testing. Quality control testing and monitoring may be done on various processes from the beginning until the final step where the acceptance sample is the last stage of quality control. It should be a formalized process by the contractor or producer to ensure compliance with specifications when acceptance testing is performed. Quality control demands that the process be displayed and updated on a continuing basis. The Contractor/Producer must have a means to demonstrate this quality control such as Control Charts.

Acceptance (AT) – Sampling, testing, and the assessment of test results to determine whether or not the quality of produced material or construction is acceptable in terms of the specifications. Acceptance tests are compared to the specifications for compliance with material or construction specification limits. They may be the average of several tests as is the case in testing performed on a lot/sublot basis, rather than individual sample results. The acceptance tests may be one of the quality control tests, but should be considered differently.

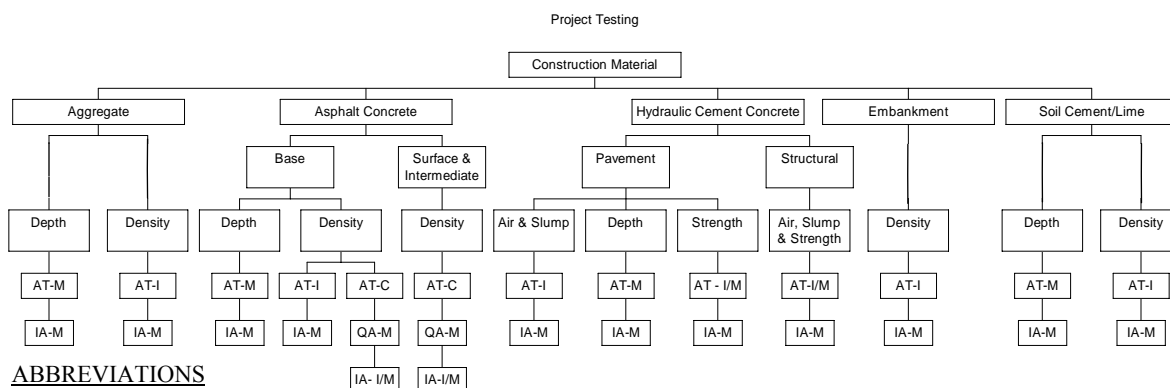
Independent Assurance (IA) – A management tool that requires an independent party, not directly responsible for quality control or acceptance testing, to provide an independent assessment of the product and/or the reliability of test results obtained from the acceptance testing. (The results of independent assurance tests are not to be used as a basis of product acceptance.) Independent assurance samples are used to evaluate the accuracy of acceptance sampling and testing, operations and equipment. Independent assurance sampling and testing is generally performed on split samples to eliminate variability of results that would be expected from testing different samples. The results are to be compared with the results from the acceptance test performed on the split sample to ensure those test results are reasonable. The IA results are not compared to the specification limits.

Quality Assurance (QA) – The process of determining the accuracy of sampling and testing results by examining the data and/or providing objective evidence to verify the contractor’s quality control sampling and testing which is used in the agency’s acceptance decision. The Materials Section always performs quality assurance assessment, sampling and testing. Quality assurance assessment of asphalt and dense graded aggregate plant produced materials is not performed by taking separate samples, but is an interpretation of the data from the IA samples and tests. This interpretation is performed within the asphalt and dense graded aggregate database programs.

Sec. 206.02 Project Site Testing

(a) Acceptance Testing by construction inspectors include slump, air and cylinders for concrete, and density for asphalt, soil, and aggregates. See Section 314.01, 400 and 503.02 for frequency of testing. If the testing is done by the contractor, QA testing will be performed by the District Materials Section at the rate specified in the charts that follow.

(b) Independent Assurance for materials sampled and tested in the field I (i.e. densities, concrete) shall be performed by the District Materials Section. The sampling and testing should be performed at the same time and location as the acceptance tests performed by the project inspector at the rates specified in the charts that follow. The results of the tests should be immediately compared to the acceptance test. If the comparison shows the test results to be very similar, then the acceptance test may be used. If there is a significant difference in the test results then an explanation of the actions taken to resolve the difference should be noted. For thin lift density, IA will be performed by the project inspection or Materials personnel in accordance with 504.01(h).



ABBREVIATIONS

AT – Acceptance

IA – Independent Assurance

C – Performed by Contractor

I – Performed by Inspector

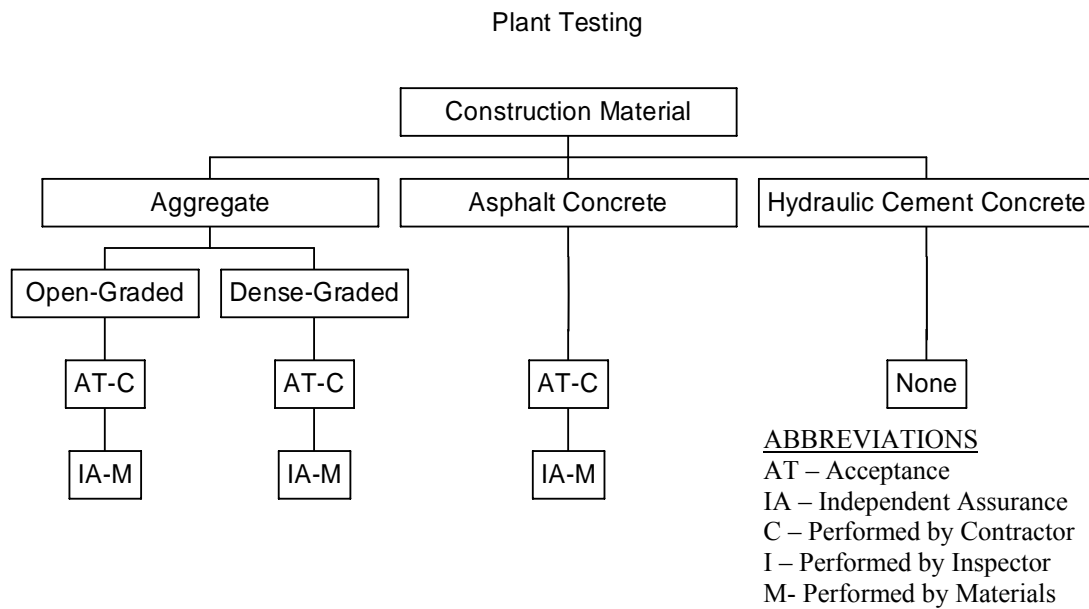
M- Performed by Materials

Sec. 206.03 Plant Site Testing

(a) Acceptance Testing is performed by the producer for gradation and cement/asphalt content on central mixed aggregate and asphalt mixtures. See Section 311.05 and 502.04 for frequency.

(b) Quality Assurance testing of plant-produced materials is not performed on separate samples, but is an interpretation of the data from the IA tests. This interpretation is performed within the asphalt and aggregate database programs.

(c) Materials accepted on the basis of the producers QC program, such as central mixed aggregates and asphalt mixtures will be evaluated on an annual plant specific IA program annually rather than on a project specific program. The IA test results will be compared to the producers test results by the computerized database in accordance with Chapter III and V and flag any deviations. These deviations will need to be investigated, and a report written to show the actions taken.



MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
1. Aggregates - (a) Base, Subbase, & Select Material (Untreated) - (
1.(a)(1) Depth..	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof. Minimum of one per project, unless total quantity of individual material (base, sub-base, etc.) is less than 500 tons (500 metric tons) per project, in which case no I.A. test required for that material.	From Roadway.	Results of I.A. depth tests to be recorded on Form TL-136. If acceptance depth tests are randomly selected as I.A. depth tests, these will also be recorded on Form TL-105. I.A. depth tests should be made at the same station as the acceptance test.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
1.(a)(2) Density, Nuclear....	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, consisting of the average of 5 readings. Minimum of 5 readings per project, unless total quantity of individual material (base, subbase, etc.) is less than 500 tons (500 metric tons) per project, in which case no I.A. test required for that material.	From roadway.	Location of 5 density readings at a station selected for acceptance test. See Note 4 for density method and Note 5 for reports. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. It is desirable to use a nuclear gauge for the I.A. test other than that assigned to the project. It is permissible to use the same gauge as assigned to the project.) If acceptance density tests on Special Projects listed in Sec. 208 have been waived by District Materials Engineer, no I.A. density tests are required, provided this is documented in project records.
1.(a)(3) Density, Other Methods..	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, if nuclear method not used. Minimum of one per project, unless total quantity of individual material (base, subbase, etc.) is less than 500 tons (500 metric tons) per project, in which case no I.A. test required for that material. See Remarks.	From roadway.	Results of I.A. density tests to be recorded on Form TL-136. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. When using test methods other than nuclear, I.A. personnel should use test equipment other than that assigned to the project.) If acceptance density tests on Special Projects listed in Sec. 208 have been waived by District Materials Engineer, no I.A. density tests are required, provided this is documented in project records.
1.(b) Shoulder Material (Untreated) - (

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
1.(b)(1) Depth....	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, alternating sides. Minimum of one per project, unless total quantity of shoulder material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required.	From roadway, alternating sides.	Results of I.A. depth tests to be recorded on Form TL-136. If acceptance depth tests are randomly selected as I.A. depth tests, these will also be recorded on Form TL-105. 1A depth tests should be performed at the same station as the acceptance test.
1.(b)(2) Density, Nuclear	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, alternating sides, consisting of the average of 5 readings. Minimum of 5 readings per project, unless total quantity of shoulder material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required. See Remarks.	From roadway, alternating sides.	Location of 5 density readings at a station selected for acceptance test. See Note 4 for density method and Note 5 reports. (Although optional, it is suggested that the density test method used for both I.A. and acceptance test be the same, either nuclear or other approved method, as the case may be. It is desirable to use a nuclear gauge for the I.A. test other than that assigned to the project. It is permissible to use the same gauge as assigned to the project.) If acceptance density tests on Special Projects listed in Sec. 208 have been waived by District Materials Engineer, no I.A. density tests are required, provided this is documented in project records.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
1.(b)(3) Density, Other Methods..	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, alternating sides, if nuclear method not used. Minimum of one per project, unless total quantity of shoulder material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required. See Remarks.	From roadway, alternating sides.	Results of I.A. density tests to be recorded on Form TL-136. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. When using test methods other than nuclear, I.A. personnel should use test equipment other than that assigned to the project.) If acceptance density tests on Special Projects listed in Sec. 208 have been waived by District Materials Engineer, no I.A. density tests are required, provided this is documented in project records.
3.(a) Asphalt Concrete Base, Binder, & Surface Material - (

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
3.(a)(1) Depth....	One test per 2 roadway miles (3 roadway kilometers), or fraction thereof. Minimum of one per project, unless combined total quantity of all asphalt concrete material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required. Also, depth tests of binder or surface material required <u>only</u> if specific plan depths are called for, <u>not</u> when plans specify rate of application.	From roadway.	Results of I.A. depth tests will be determined from cores drilled from, or sections sawed from, pavement. Results shown on Form TL-136. If acceptance depth tests of base material are randomly selected as I.A. depth tests, these will also be recorded on Form TL-105. I.A. depth tests should be made at the same station as the acceptance test.
3.(a)(2) Density, Nuclear....	One test per 2 roadway miles (3 roadway kilometers), or fraction thereof, consisting of the average of 5 readings. Minimum of 5 readings per project, unless combined total quantity of all asphalt concrete material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required. See Remarks.	From roadway.	Location of 5 density readings at a station selected for acceptance tests. See Note 4 for density test method and Note 5 for reports. Nuclear method should be used for testing all asphalt concrete base courses, and all binder and surface courses, except those specified under, "Density, Other Methods," below. Generally, I.A. density tests of binder and surface by either method will be waived when application rates are less than those specified below. All waivers of tests are to be documented in project records. (It is desirable to use a nuclear gauge for the I.A. test other than that assigned to the project. It is permissible to use the same gauge as assigned to the project.)

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
3.(a)(3) Density, Other Methods	One test per 2 roadway miles (3 roadway kilometers), or fraction thereof, if nuclear method not used. Minimum of one per project, unless combined total quantity of all asphalt concrete material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required. See Remarks.	From roadway.	Results of I.A. density tests will be determined from sections sawed from, or cores drilled from, pavement. Results shown on Form TL-136. This method will be used in lieu of nuclear method for Types S-4 and S-5 surface mixes, when applied at a rate of 125 psy or greater, and Type I-2 binder mix, when applied at a rate of 150 psy or greater. When application rates of these materials are less than specified, I.A. density tests of these materials by either method will be waived, provided this is documented in project records.
3(b) Shoulder Material - (
3.(b)(1) Depth..	Same as 3(a)(1), Base, Binder, & Surface Material, alternating sides. Depth tests not required when plans specify rate of application. Same tonnage waiver applies.	Same as 3(a)(1), Base, Binder, & Surface Material.	Same as 3(a)(1), Base, Binder, & Surface Material.
3.(b)(2) Density, Nuclear.....	Same as 3(a)(2), Base, Binder, & Surface Material, alternating sides. Same tonnage waiver applies.	Same as 3(a)(2), Base, Binder, & Surface Material, alternating sides.	Same as 3(a)(2), Base, Binder, & Surface Material. Note method specified for type of material and application rates. Same general waiver applies, including project record documentation.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
3.(b)(3) Density, Other Methods.	Same as 3(a)(3) , Base, Binder, & Surface Material, alternating sides. Same tonnage waiver applies.	Same as 3(a)(3), Base, Binder, & Surface Material, alternating sides.	Same as 3(a)(3), Base, Binder, & Surface Material. Note method specified for type of material and application rates. Same general waiver applies, including project record documentation.
4. Concrete, Hydraulic Cement- (a) Base & Pavement Material - (1) Air & Consistency.	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof. Minimum of one per project.	At job site.	Use pressure meter or Chace air indicator and slump cone. Chace indicator may be used, provided it has been correlated with pressure meter at beginning of project. With Chace air indicator, air content shall be average of 2 readings, unless these vary more than 2% from each other, in which case air content recorded shall be average of 3 readings. Sample shall be taken at the same time as acceptance samples.
4.(a)(2) Depth....	One test per 2 miles (3 kilometers) per traffic lane (12 ft. or 3.7 m) , or fraction thereof. Minimum of one per project.	From roadway.	Core drilling program outlined in VTM-26. Location of sample may be requested by FHWA Engineers. Results of I.A. depth tests to be shown on Form TL- 136. Sample shall be from same station as acceptance sample.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
4.(b) Structural - (1) Air & Consistency...	One test shall be made on the same batches of concrete from which cylinders taken. (See 4(b)(2) below.)	At job site.	Use pressure meter or Chace air indicator and slump cone, except that air content of concrete for bridge decks <u>must</u> be taken with pressure meter. See Remarks above, (4(a)(1), for special requirements in use of Chace air indicator. Tests shall be performed from the same load as acceptance sample.
4.(b)(2) Cylinders.	(4)(b)(2) Cylinders Minimum one set per 1000 cubic yard (750 cubic meters) of structural concrete, except that IAS will not be required for projects having less than 300 cubic yards (230 cubic meters). If more than one set is needed per project, the samples should be taken from different classes. One set of 3 cylinders from the same batch as acceptance samples. At job site. Location of samples may be selected as directed by District Materials Engineer, his staff, or FHWA Engineer. All cylinders to be tested at 28 days.	At job site.	Location of samples may be selected as directed by District Materials Engineer, his staff, or FHWA Engineer. All cylinders to be tested at 28 days. Cylinders should be from the same load as acceptance samples.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
5. Embankments - (a) Density, Any Method	One test per 100,000 yd ³ (75,000 m ³), or fraction thereof, with minimum of one test per project.	From roadway.	See Note 3 for nuclear test method and Note 5 for reports. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. I.A. personnel should use test equipment other than that assigned to the project.) If acceptance density tests on Special Projects listed in Sec. 208 have been waived by District Materials Engineer, no I.A. density tests are required, provided this is documented in project records.

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
<p>6. Soil-Cement or Soil-Lime - (a) Stabilized Subgrade (Mat'l- in-Place or Imported Mat'l, Other Than Aggregate Base, Subbase, or Select Material) (1) Depth....</p>	<p>One test per 4 roadway miles (6 roadway kilometers), or fraction thereof. Minimum of one per project, unless stabilization work is less than one mile (2 kilometer), in which case no I.A. test required.</p>	<p>From roadway.</p>	<p>Results of I.A. depth tests to be recorded on Form TL-136. If acceptance depth tests are randomly selected as I.A. depth tests, these will also be recorded on Form TL-105. Tests should be from the same station as acceptance test.</p>
<p>6.(a)(2) Density, Any Method....</p>	<p>One test per 4 roadway miles (6 roadway kilometers), or fraction thereof. Minimum of one per project, unless stabilization work is less than one mile (2 kilometer), in which case no I.A. test required.</p>	<p>From roadway.</p>	<p>See Note 3 for nuclear test method and Note 5 for reports. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be I.A. personnel should use test equipment other than that assigned to the project.) Location of tests should be at the same station as acceptance tests.</p>

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
6.(b) Treated Aggregate Base, Subbase, & Select Materials (Regardless of Where Used in Pavement Structure) (
6.(b)(1) Depth.	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof. Minimum of one per project, unless quantity of treated material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required.	From roadway.	Results of I.A. depth tests to be recorded on Form TL-136. If acceptance depth tests are randomly selected as I.A. depth tests, these will also be recorded on Form TL-105. Depth tests are to be taken at a station selected for acceptance testing.
6.(b)(2) Density, Nuclear....	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, consisting of the average of 5 readings. Minimum of 5 readings per project, unless quantity of treated material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required.	From roadway.	Location of 5 density readings at a station selected for acceptance testing. See Note 4 for density method and Note 5 for reports. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. It is desirable to use a nuclear gauge for the I.A. test other than that assigned to the project. It is permissible to use the same gauge as assigned to the project.)

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
6.(b)(3) Density, Other Methods.	One test per 4 roadway miles (6 roadway kilometers), or fraction thereof, if nuclear method not used. Minimum of one per project, unless quantity of treated material is less than 500 tons (500 metric tons) per project, in which case no I.A. test required.	From roadway.	Results of I.A. density tests to be recorded on Form TL-136. (Although optional, it is suggested that the density test method used for both I.A. and acceptance tests be the same, either nuclear or other approved method, as the case may be. When using test methods other than nuclear, I.A. personnel should use test equipment other than that assigned to the project.)

MINIMUM INDEPENDENT ASSURANCE SAMPLING REQUIREMENTS

MATERIAL AND TEST	MINIMUM SAMPLING RATE	LOCATION FROM WHICH SAMPLE TAKEN	REMARKS
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Note 1. The above listed samples shall be obtained, packed, marked, and submitted to the proper Laboratory for testing, as outlined in the sections covering each individual material in Secs. 200, 300, 400, and 500, unless otherwise noted in Secs. 202.04 or 206.

Note 2. Nuclear density tests of embankments and soil-cement or soil-lime stabilized subgrade will be conducted using the Direct Transmission Method of testing.

Note 3. Nuclear density tests of cement or lime treated aggregate base, subbase, and select materials, untreated aggregate base, subbase, select, and shoulder materials, and asphalt concrete materials will be conducted using the Backscatter, Control Strip Method of testing.

Note 4. Independent assurance nuclear density test reports will be made on Forms TL-53, TL-54, TL-55, and TL-124, depending on type of material. Likewise, other tests and materials will be reported on the same forms as used for routine acceptance testing. All forms used to report I.A. testing will be marked "I.A. Test". In addition to the detailed test reports, all I.A. depth and density tests shall be tabulated on Form TL-136. See Sec. 202.04 for proper distribution of I.A. reports.

SECTION 207 SUMMARY OF MATERIALS SUBJECT TO MODIFIED INSPECTION AND ACCEPTANCE PROCEDURES

Listed herein are the materials that may be accepted on the basis of modified inspection procedures, when meeting the criteria outlined in Sec. 109.03, together with the specific acceptance criteria outlined below, and providing that the material has no apparent defects. The materials subject to modified acceptance are separated into types of construction, such as, general, rest area, and signalization or other electrical system installation. The lists are not all inclusive, but they do provide a basic guideline, that should be useful in determining the requirements for acceptance of many of the various miscellaneous materials. See also Sec. 208 for additional details of and requirements for acceptance of materials on Special Projects.

It should be noted that, in some cases herein, materials are listed that require either full testing or partial testing coupled with some form of certification for acceptance. This is particularly true for rest area and electrical materials, and the materials are shown this way in an effort to further distinguish between similar miscellaneous materials that may be accepted by modified procedures and those that require testing. If a material is to be used that is not listed herein or elsewhere in Sec. 200 of the Manual, the District Materials Engineer should be contacted promptly for instructions for proper acceptance of the material.

Where materials notebooks are required, a record of all material accepted on modified inspection must be entered in the book, giving complete information as to the type of material, accurate quantity, source, and condition as determined by visual inspection. See Sec. 208 for details of types of projects not requiring a materials notebook.

Sec. 207.01 Manufacturers' and Producers' Certifications

As previously noted, one of the means of modified acceptance of materials is through the use of Manufacturers' and Producers' certifications, certificates of compliance, mill analyses, shop drawings, catalog cuts (in certain cases), or other similar approved documentation in lieu of test reports.

In the case of materials accepted on Manufacturer's certification, the Central Office Laboratory (usually the General Services or Structures Section) will review and approve the certification upon receipt, or have it reviewed by the appropriate Central Office Division, assign a number (which will appear in the lower right portion of the cover letter of transmittal), and distribute the necessary copies to the field, the same as routine test reports, except as noted hereafter. See Sec. 106.01 (b) for details of initial handling and routing of certifications.

The certification number should be treated the same as a test report number and recorded in the materials notebook by the Project Inspector. (See Sec. 208 for details of projects not requiring a materials notebook.) Approved and numbered certifications, for materials requiring same, should be received from the Central Office within 3 calendar weeks of delivery of the subject material at destination, either at the project site or from Purchase Order at the Residency. If the certification is not received in the prescribed time, the Project Inspector or Resident Engineer should forward to the District Materials Engineer the certification copy, if any, received with the material shipment. This will, in turn, be forwarded to the Central Office Laboratory for approval, numbering, and distribution. If no copy has been received at the project or Residency, either with the shipment or from the Central Office within 3 calendar weeks of delivery of material, then the Central Office Laboratory must be notified promptly through the District Materials Engineer, in order that proper certifications can be obtained.

Following are details of distribution and routing for some of the most customary types of certifications.

(a) Routine Constructions Projects

In the case of materials accepted by letter of certification or certificate of compliance on routine construction projects, the Supplier normally will send one copy of the certification with the shipment of material to the project and the original and 2 copies to the District Materials or Resident Engineer, as directed. After initial review, these shall be forwarded to the State Materials Engineer, who will process and distribute to the field as noted above. Distribution will be the same as for test reports.

(b) Rest Area Projects

In the case of rest area projects, certifications for materials requiring same will be routed to the State Materials Engineer, who will process and distribute to the field as noted above. If the certifications are received first by the Environmental Quality Division, usually from the Architect, Consultant, or Contractor, then that Division will forward the certifications to the State Materials Engineer, after first reviewing the documents for specification compliance with physical, dimensional, mechanical, or other pertinent requirements. This includes catalog cuts used in lieu of Manufacturers' certifications. Field distribution of the certifications will include copies for both the District Materials Engineer and the District Environmental Coordinator or Environmental Specialist.

(c) Signalization and Electrical System Installation Projects (Administered by Traffic Engineering Division)

In the case of signalization and electrical system installation projects administered by the Traffic Engineering Division, acceptance of electrical materials and equipment used therein will be in accordance with the Pre-Approved Traffic Control Device Listing published by that Division. Where indicated on the list, certain materials will require testing. See Also Sec. 207.04.

(d) Signalization and Electrical System Installation (Administered by Equipment Division)

In the case of materials obtained on special order by the Equipment Division for signalization and electrical system work, certifications for these materials where required normally will be obtained by the Equipment Division and forwarded to the State Materials Engineer after receipt and review for specification compliance. This includes catalog cuts used in lieu of Manufacturers' certifications.

After processing, the Central Office Laboratory will keep the certifications on file with other related job records as required. The Equipment Division will be advised by the Central Office Laboratory General Services Section of the approval and disposition of the documents.

(e) Purchase Order Material

In the case of materials obtained on Purchase Order for stocking either at the Central Warehouse or at Residencies, the Central Office Laboratory will be sent copies of the Purchase Orders by the Administrative Services Division. From these, the Materials Division will obtain certifications for materials requiring same, will process the certifications, and will distribute to the field as necessary. Copies will be sent to the District Materials Engineer and Resident Engineer, if material is for Residency stock. The original of the certification will be retained in the Central Office Laboratory, General Services Section in the file with the respective Purchase Order.

(f) Substitution of Catalog Cuts

In certain cases and for certain materials, catalog cuts may be used in lieu of Manufacturers' certifications, provided that specific criteria are met. See list of materials herein to which this procedure specifically applies. The criteria are as follows:

- (1) The material in question must be listed specifically herein as subject to this type acceptance and not specifically requiring testing.
- (2) The catalog cut must contain a "reviewed" stamp, signed by a representative of the Environmental Quality Division or Equipment Division who is handling the administration of the job.
- (3) The catalog cut must contain the project number or Purchase Order number.
- (4) If the catalog cut contains a number of items, the designated item for use must be distinguished in some way, such as underlining, check mark, or other means.
- (5) If the job specifications require that the material meet a certain specification, then either the catalog cut must contain this statement or a separate statement to this effect must be furnished by the Contractor or Supplier.

Where catalog cuts are used in lieu of Manufacturer's certification, these should likewise be forwarded to the State Materials Engineer for review and approval, as outlined above.

Sec. 207.02 Materials for General or Routine Construction

Listed below are various materials for use in general or routine construction and the criteria by which the materials may be accepted on modified inspection basis. The list includes those materials or types of construction used on Special Projects, as outlined in Sec. 208, except rest area and traffic signalization and electrical system installation projects. These are covered separately below.

The materials listed below may be accepted on modified inspection procedures in the amounts and under the conditions specified. Larger amounts of material than those specified must be tested, and, where test reports have been received to cover any of these materials, they should be recorded in the proper place in the materials notebook.

- (1) Admixtures, concrete. (By approved annual list from the Materials Division. See Sec. 209.)
- (2) Aggregates -
 - (a) Open graded, for hydraulic cement concrete, when used in sign islands, sign footings, culvert joint mortar, or other small incidental items. (50 Tons (50 metric tons) or less per size per project requires no testing.)
- (3) Aluminum alloys, sheet, plate, etc. (Approved on Manufacturer's certified physical and chemical analyses.) (Sign blanks accepted on visual inspection, with occasional sample to be checked for dimensional requirements of specifications (thickness, etc.). For other specified aluminum items, see Fencing, Pipe, and Poles and Posts herein.)
- (4) Antistripping additives. (By approved annual list from the Materials Division. See Sec. 209.)
- (5) Asphalt release agents. (By approved annual list from the Materials Division. See Sec. 209.)
- (6) Asphalt impregnated woven fabric. (100 yd² (100 m²) or less requires no testing or certification.)
- (7) Bearing pads and bedding materials.
 - (a) Bearing pads used for transverse lateral tensioning of prestressed concrete bridge beams. (Require no testing or certification.)

- (b) Sheet lead and common desilverized lead bedding material. (Same as Item 7(a) above.)
- (8) Asphalt Concrete. (Not conforming to Sec. 211 of Road and Bridge Specifications.)
 - (a) H-Order materials for winter patching use only. (When the material is obtained at a rate of 50 tons (50 metric tons) or less per day, the Resident Engineer may, at his discretion, accept material being produced for private or other use. Waiver of specification applies only to requirements such as, job-mix approval, certification of compliance with specifications, providing Certified Technician, testing, etc.; but waiver does not apply to specification requirements of plant facility itself.)
 - (b) H-Order material for emergency repair to restore traffic. (Material produced for non-highway use may be purchased for this purpose, provided the action has the specific approval of the Administrative Services Officer or the Maintenance Engineer prior to the purchase, and that the action and verbal approval are confirmed in writing by the Resident Engineer as soon after the event as practicable. Provisions and prohibitions of the waiver are the same as Item 8(a) above.)
- (9) Brick. (1000 or less require no testing.)
- (10) Bronze and copper alloy. (Approved on Manufacturer's certified physical and chemical analyses.)
- (11) Building paper. (Requires no testing or certification.)
- (12) Cement, hydraulic. (Approved on Manufacturer's certifications, with periodic bin analyses being supplied to Central Office Laboratory. In addition, District Materials Laboratory will take one check sample per project per 5000 yd³ (5000 m³) of concrete, or one per project for projects in excess of one mile (2 km) of cement stabilization.) (See also Sec. 204.09 herein.)
 - (a) For hydraulic cement concrete projects containing less than 500 yd³ (500 m³) of concrete. (Approved on Manufacturer's certification and requires no check sampling.)
 - (b) For cement stabilization work containing less than one mile (2 kilometers) of stabilization. (Same as Item 12(a) above.)
 - (c) For hydraulic cement concrete, when used in sign islands, sign footings, culvert joint mortar, or other incidental items. (Requires no certification or check sampling.)
- (13) Compaction tests for embankments, and aggregate bases and subbases on Special Projects listed in Sec. 208. (Compaction tests are encouraged on a random basis, unless specifically waived by the District Materials Engineer.)
- (14) Concrete, miscellaneous hydraulic cement, including all concrete, except base, pavement, prestressed, and structural (bridges, box culverts, and retaining walls), in projects containing less than 50 cu.yd. (38 m³) (District Materials Engineer may waive requirement for casting compressive strength cylinders.) (See also Sec. 400 herein.)
- (15) Copper sheet and strip for metal waterstops. (Requires no testing or certification.)
- (16) Curing materials and protective coatings for hydraulic cement concrete.
 - (a) Monomolecular film. (Requires no testing or certification.)
 - (b) Spray-on surface finish. (By approved list.)
- (17) Electrical fittings and components. (See also Sec. 204.14(g). For those used in rest area and traffic signalization and electrical system installation projects, see Secs. 207.03 and

207.04 herein. In order for modified acceptance to apply, it is essential that Source of Materials letter indicate the type conduit (PVC, metal, etc.) intended for use.)

- (a) Acrylonitrile-butadiene-styrene (ABS) fittings. (Require no testing or certification.)
- (b) Aluminum conduit and fittings. (May be accepted, when permitted for use, on certification that it meets requirements of ANSI C80.5.)
- (c) Asbestos-cement conduit and fittings. (Conduit approved on Manufacturer's certification. Fittings do not require testing or certification.)
- (d) Metal fittings. (Approved on Manufacturer's certified analysis, including zinc content. If galvanized steel conduit and fittings are to receive mastic coating, acceptance may be based on certification that material is galvanized and will be coated with Department approved mastic. If it is not to be mastic coated, galvanized coating must be tested at location and in manner designated on Source of Materials letter.)
- (e) Plastic and PVC conduit and fittings. (Accepted by certification from a Manufacturer or Supplier stating that only PVC, Schedule 40, UL approved conduit will be used. Verification that the schedule 40 is being used may be made through the District Materials Office. Fittings (couplings, tees, elbows, ells, etc.) may be accepted in the same manner. It is not absolutely necessary that the same brand of material be used in the same installation, as long as the parts "mate" and meet the above criteria.)
- (f) Boxes, except junction boxes. (Same as Item 17(a) above.)
- (g) Pole line hardware. (May be accepted on brand name. The following 3 Manufacturers' products are acceptable. Any others must be submitted to the Materials Division prior to use:

McGraw-Edison Pittsburgh, Pa.
Joslyn Co. Franklin Park, Il.
A. B. Chance Co. Centralia, Mo.

Among other items, pole line hardware includes bolts, bands, thimbleye and ovaleye bolts, brackets, clamps, clevises, hangers, nuts, pins, anchor rods, staples, thimbles, and washers.)

- (18) Epoxy resins. (15 Gallons (60 L) or less for any one project approved on Manufacturer's certification. Powdered epoxy resins for coating of reinforcing steel accepted by approved list from Materials Division. (See Sec. 209.)
- (19) Fencing.
 - (a) Rods, fittings, and gates for chain-link fencing, including electrical ground rods, wire, and clamps. (Require no testing or certification.)
 - (b) Rods, fittings, and gates for standard fencing, including electrical ground rods, wire, and clamps. (Same as Item 19(a) above.)
 - (c) Standard fencing, lawn. (Same as Item 19(a) above.)
 - (d) Standard fencing, farm fence to replace old, or damaged fence to be reset only. (Same as Item 19(a) above.)
- (20) Fiber, hollow forming tubes or shapes for prestressed concrete box slab beams, or hollow piles. (Require no testing or certification.)
- (21) Filter Cloth, Fabric, Silt Fence and Other Geotextiles. (Up to 3 rolls of material may be accepted on contractors certification that materials were tested for a previous project.)

- (22) Guardrail, steel beam. (Shipments accepted at job site on visual inspection. Suppliers or Erectors shall file with State Materials Engineer annual certificates of compliance and guarantee. Check samples obtained each 6 months in each District. See also Sec. 209.)
- (23) Hardware staples, washers, and miscellaneous. (Require no testing or certification.)
- (24) Joint material.
 - (a) Elastomeric expansion dam. (Approved on Manufacturer's certification, together with certified materials test results from qualified independent laboratory. For details of acceptance of steel anchor bolts, nuts, washers, and stud anchors for expansion dam, see Item 36 (g) below.)
 - (b) Silicone. (Accepted on basis of list distributed by Materials Division.)
 - (c) Waterstops, sheet copper metal. (Require no testing or certification.)
- (25) Jute mesh and soil retention mats. (Require no testing or certification.)
- (26) Landscape materials.
 - (a) Fertilizer. (Accepted on receipt of certification by furnishing Form of Affidavit.) If the contract quantity is four (4) tons (4 metric tons) or less, the specified or equivalent fertilizer may be accepted on visual inspection, with no certification required.
 - (b) Herbicides. (Visually inspected to determine that Manufacturer's container is labeled as required, with composition, brand, and name and address of Manufacturer. Questionable sources will be checked to determine that material is registered with the Department of Agriculture and Consumer Services.)
 - (c) Mulch. (Fiber mulch approval is based on semiannual source/inventory sampling program and inclusion on approved list. See Sec. 209.)
 - (d) Seed. (Same as Item 26(a) above.) When the contract quantities for regular seeding, plus legume seeding, is 500 lbs. (255 kg) or less and the seed is acquired from a Virginia Dealer, the seed may be accepted on visual inspection and no certification will be required.
- (27) Lime.
 - (a) Agricultural. (Approved from periodic Department of Agriculture and Consumer Services list provided by Environmental Quality Division, showing laboratory test results of lime sources. District Materials Engineer must compare list with proposed job source for each project to check calcium carbonate equivalent and, in addition, must take one sample per project for grading test. See Sec. 209.) When the total contract quantity for agricultural lime or pulverized limestone is 10 tons (10 metric tons) or less and the supplier is on the approved list, the material may be accepted on visual inspection with no sampling or certification requirements.
 - (b) Hydrated. (Approved on Manufacturer's certification except from new sources.)
 - (c) Hydraulic. (Same as Item 27(b) above.)
- (28) Masonry. (Up to 50 Concrete Masonry Units may be accepted on visual inspection.)
- (29) Paint. (20 Gallons (75 L) or less per project requires no testing. Paint, Systems B and F, accepted on approved list and certification. See Sec. 209.)
- (30) Piling.

- (a) Steel H-beam, sheet, and shell. (Approved on Manufacturer's mill analysis, and requires no sampling or mill inspection.)
 - (b) Timber. (Requires no testing or certification, but will require visual inspection. Preservative and treatment for treated piles approved at point of treatment.)
- (31) Pipe. (When the quantity of any approved type of culvert pipe is 50 ft. (15 m) or less per project, requires no testing or certification.) Otherwise, modified acceptance is handled as follows:
- (b) Cast iron. (Visual inspection)
 - (c) Cattle guard and copper water pipe. (Requires no testing or certification.)
 - (f) Gaskets and coatings. (By approved list of brand names. See Sec. 209.)
 - (g) Municipal sewer and water pipe. (Approved on Manufacturer's certification. See Sec. 204.26(n) for list.)
 - (h) Poly(vinyl chloride) (PVC) plastic pipe fittings. (Same as Item 31(c) above.)
 - (i) Seamless steel, black and galvanized fittings. (Approved on Manufacturers' certified analyses, including zinc coating.)
 - (j) Smooth wall steel pipe used for jacking. (Approved on Manufacturer's certified physical and chemical analyses.)
 - (k) Stakes and hardware for bituminized-fiber slope and shoulder drains. (Visual Inspection.)
 - (m) Waterline or handrail pipe. (15 Lengths or less.)
 - (n) Weepole pipe for abutments and retaining walls. (Same as Item 31(c) above.)
- (32) Poles and posts. (For those items used in rest area and traffic signalization and electrical system installation projects, see Secs. 207.03 and 207.04 herein.)
- (a) Aluminum alloy pipe for chain-link or standard end, corner, and gate fence posts and braces. (Approved on Manufacturers' certified physical and chemical analyses.)
 - (b) Aluminum alloy H-column and round aluminum alloy pipe for chain-link line fence posts and braces. (Same as Item 32(a) above.)
 - (c) Aluminum alloy traffic sign poles, lighting standards, etc., including breakaway support couplings. (Same as Item 32(a) above.)
 - (d) Locust posts for fencing. (Requires no testing or certification.)
 - (e) Steel guardrail posts. (Shipments accepted at job site on visual inspection. Suppliers or Erectors shall file with State Materials Engineer annual certificates of compliance and guarantee. Check samples obtained each 6 months in each District.)
 - (f) Steel posts for snow fence and miscellaneous small signs. (Same as Item 32(d) above.)
 - (g) Structural steel, rolled rail steel, and galvanized steel traffic sign poles and posts, lighting standards, etc. (See Item 36(g) below for details of acceptance.)
 - (h) Treated wood fence and guardrail posts. (Normally not sampled on project. Preservative and treatment for treated posts approved at point of treatment.) (Up to 10 Guardrail Posts for GR-7 may be accepted on visual inspection.) (Up to 25 sign or fence posts, where #2 Southern Pine is permitted will require no testing or certification if each unit is properly

- tagged, indicating both Grade #2 and the preservative treatment retention exceeds 0.40 pounds per cubic foot (6.4 kilogram per cubic meter) and/or “ground contact”).
- (i) Treated wood traffic sign poles and posts. (Same as Item 32(h) above.)
 - (j) U-Type galvanized rolled rail steel or aluminum alloy locator posts for RM-2 R/W monuments. (Same as Item 32(a) above.)
- (33) Reflective materials.
- (a) Retro-reflective sheeting, for use in barricades, channelizing devices, and sign blanks. (Approved on Manufacturer's certification, based upon prior laboratory/field evaluation.)
- (34) Soil Surveys. (Not required on Special Projects listed in Sec. 208.)
- (35) Spring box overflow. (Requires no testing or certification.)
- (36) Steel. (For those items used in rest area and traffic signalization and electrical system installation projects, see Secs. 207.03 and 207.04 herein.)
- (a) Castings, forgings, and shafting, except gray-iron castings. (Approved on Manufacturers' certified physical and chemical analyses.)
 - (b) Grid flooring. (Same as Item 36(a) above.)
 - (c) Miscellaneous metals (timber connectors). (Same as Item 36(a) above.)
 - (d) Reinforcement. (All except bar mat and welded wire fabric). (Approved on Fabricator's certification and mill analysis for each heat, supplemented with monitor sample each month from each size bar per plant.) (Up to 100 sq. ft. (10 m²) of welded wire fabric may be accepted on visual inspection.)
 - (e) Reinforcement, bar mat. (Approved at point of fabrication and requires no sampling.)
 - (f) Reinforcement bar supports, stainless steel or galvanized. (Approved on Manufacturer's or Supplier's certification. See additional details in Sec. 204.32(e)(7).)
 - (g) Structural steel items; such as, anchor bolts, nuts and washers for elastomeric expansion dams (Item 24(a) above), bolts (except bimetallic and stainless steel anchor bolts), anchor base plates for mast poles, anchor bolts for high mast lighting standards, anchor base flange and shaft for high mast lighting standards, box beam median barriers, copper-bearing steels, curb angles, eyebars, manhole steps, galvanized, rolled rail, or structural steel for traffic sign poles and posts and lighting standards, etc. (Item 32(g) above), structural carbon steel, high-strength steels, stud anchors for elastomeric expansion dams (Item 24(a) above), and drilled well casings and screens. (Approved on Manufacturer's mill analyses and shop inspection, together with fabrication inspection report and Fabricator's Certificate of Compliance, as required.)
 - (h) Structural steel high-strength bolts, nuts, and washers. (Approved on Manufacturer's test report and Fabricator's Certificate of Compliance together with shop inspection report, if any.)
 - (i) Structural steel corrugated metal bridge deck forms and accessories. (Approved on Manufacturer's Certificate of Compliance and mill analysis. The District Materials Engineer is to random sample this periodically.)
 - (j) Structural steel drop inlet steel angles, bars, and/or pipe. (Approved on Fabricator's mill analyses and Manufacturer's certifications for galvanizing. Plant Inspector will issue

- inspection reports. If billet steel bars are used, these will require sampling and testing. Five (5) units or less of drop inlet grates and covers accepted without certification.)
- (k) Structural steel filler metals. (Accepted on approved lists of electrodes and wire-flux combinations. See Sec. 209.)
- (l) Structural steel stud shear connectors. (Accepted on approved list of Manufacturer's brand names. See Sec. 209.)
- (m) Structural steel, miscellaneous, such as sole and gusset plates fabricated from stock material. (Approved on Fabricator's mill analyses and certifications together with fabrication inspection reports.)
- (n) Wire strand and assembly or plain structural steel rods or bolts for transverse lateral tensioning of prestressed concrete bridge beams in place. (Requires no testing or certification.)
- (o) Steel pile points and timber pile shoes. (Same as Item 36(n) above.)
- (p) Steel pins for RM-2 R/W monuments. (Same as Item 36(n) above.)
- (37) Structural timber and lumber. (Requires no testing or certification. Preservative and treatment approved at point of treatment.)
- (38) Water, approved for drinking. (Requires no testing or certification.)
- (39) Waterline valves and fittings. (Approved on Manufacturer's certifications or brand names specified.)
- (40) Waterproofing and dampproofing materials.
- (a) Asphalt and primer. (One drum lots or less require no testing or certification.)
- (b) Joint sealers. (Same as Item 40(a) above.)
- (c) Waterproofing membranes. (Approved on Manufacturers' certifications.)
- (41) Temporary Materials. (Contractor furnished items for temporary installations such as slope drains, detours, etc., items such as guardrail and culvert pipe may be used material accepted on visual inspection.)
- (42) Temporary Traffic Control Devices such as barricades , channelizing devices, impact attenuators, warning lights, electronic arrows, and truck mounted crash cushions shall be accepted on visual inspection.

Sec. 207.03 Materials for Rest Area Construction

Materials listed below are those commonly used in rest area construction. In some cases, the materials specification commonly used in rest area contracts may also be listed with the material. It should be noted that occasionally other materials specifications may be used; however, the acceptance criteria will be the same as shown herein. Some of the materials listed may be found to be duplicated in other lists appearing in Secs. 207.02 and 207.04. However, if the material is to be used specifically in rest area construction, then the acceptance of the material will be governed by the criteria outlined below.

Where materials acceptance is by sample, shop drawings, or cut sheets (catalog cuts) as indicated below, these are to be submitted to the Environmental Quality Division for approval prior to use of the material. "Sample" in this case refers to color chips, sample panels, or other architectural models for visual examination by the Environmental Quality Division. Manufacturers'

certifications covering materials requirements are to be forwarded to the State Materials Engineer, as outlined in Secs. 207.01 and 207.01(b).

Where both catalog cuts and certifications are listed below for materials acceptance, catalog cuts may be used in lieu of certifications, provided that all criteria listed in Sec. 207.01(f) are met, and provided that no testing is required. Where testing is specified, see other Sections of the Manual for the specific sampling and testing requirements of the individual material concerned. In this case, the material may not be accepted solely on modified inspection.

(a) Rest Area Building

Following are the materials usually found in the rest area building proper, together with the acceptance criteria.

- (1) Building foundation compaction. (Test.)
- (2) Pipe bedding foundation compaction. (Test.)
- (3) Concrete footings and slabs. (Test.)
- (4) Hydraulic cement, portland, for floors, ASTM C150. (Manufacturer's certification and check test, as outlined in Sec. 204.09 herein.)
- (5) Aggregate, fine and coarse, for concrete. (Test.)
- (6) Reinforcing steel. (Test.)
- (7) Reinforcing wire fabric. (Test.)
- (8) Expansion joint filler, AASHTO M213. (Test.)
- (9) Building brick, ASTM C62, Grade SW. (Manufacturer's certification and visual inspection.)
- (10) Brick (Face, watertable, arch, paving.) (Sample, Manufacturer's certification, and visual inspection.)
- (11) Masonry block, ASTM C90, Grade N, Type I. (Test.) (See Sec. 204.22(a).)
- (12) Hydraulic cement, portland, ASTM C150, Type I, and blended hydraulic cement, ASTM C595, for masonry. (Visual inspection only. Cement for use in exterior wall mortar, ASTM C270, Type N, will require color sample for examination by Environmental Quality Division.)
- (13) Masonry cement, ASTM C91. (Visual inspection only. Cement for use in exterior wall mortar, ASTM C270, Type N, will require color sample for examination by Environmental Quality Division.)
- (14) Hydrated lime, ASTM C207. (Visual inspection only.)
- (15) Quicklime, ASTM C5. (Visual inspection only.)
- (16) Sand, ASTM C144. (Visual inspection only.)
- (17) Masonry reinforcement. (Cut sheets and visual inspection.)
- (18) Cast iron, gray, ASTM A47. (Cut sheets and visual inspection.)
- (19) Steel, ASTM A36. (Shop drawings and visual inspection.)
- (20) Cast steel, ASTM A27. (Cut sheets and visual inspection.)

- (21) Metal primer, Fed. T-T-P-615. (Visual inspection only.)
- (22) Preservative treatment on exterior woodwork. (Manufacturer's certification.)
- (23) Asphalt or coal-tar saturated roofing felt. (Visual inspection only.)
- (24) Paint. (Sample and test.)
- (25) Slate roofing, Fed. SS-S-451. (Manufacturer's certification and visual inspection.)
- (26) Snow guards, #9 B & S gauge copper or aluminum wire. (Visual inspection only.)
- (27) Gutters and downspouts, roof and other flashings, 16 oz. (453 g) (0.56 mm thickness) cold-rolled copper. (Cut sheets and Manufacturer's certification.)
- (28) Elastomeric sheeting for waterproofing. (Cut sheets and visual inspection.)
- (29) Lumber and millwork, all types (Doors, windows, etc.). (Sample, shop drawings, cut sheets, and visual inspection.)
- (30) Insulation. (Cut sheets and visual inspection.)
- (31) Weather-stripping. (Cut sheets and visual inspection.)
- (32) Caulking compound, Fed. TT-S-00230. (Cut sheets and visual inspection.)
- (33) Putty, Fed. TT-P-791, Type II for linseed oil. (Visual inspection only.)
- (34) Hardware (Nails, screws, etc.) (Visual inspection only.)
- (35) Rope yarn caulking. (Visual inspection only.)
- (36) Caulking primer. (Visual inspection only.)
- (37) Window glass. (Cut sheets and visual inspection.)
- (38) Window screens. (Cut sheets and visual inspection.)
- (39) Gypsum wall board, ASTM C36. (Cut sheets and visual inspection.)
- (40) Joint treatment and corner reinforcement for dry wall, ASTM C475. (Cut sheets and visual inspection.)
- (41) Ceramic tile. (Sample, cut sheets, and Manufacturer's certification.)
- (42) Marble window stools. (Sample, shop drawings, and visual inspection.)
- (43) Hydraulic cement, gray, portland, ASTM C150, Type I, waterproof, for ceramic tile. (Visual inspection only.)
- (44) Sand for ceramic tile. (Visual inspection only.)
- (45) Metal trim for dry wall construction. (Cut sheets and visual inspection.)
- (46) Finishing hardware (Locks, hinges, etc.) (Shop drawings, cut sheets, and visual inspection.)
- (47) Toilet room accessories (Soap dishes, towel holders, etc.)(Cut sheets and visual inspection.)
- (48) Electric cabinet unit heaters. (Cut sheets and visual inspection.)
- (49) Electric water heaters. (Cut sheets and visual inspection.)

- (50) Incinerator vent draft inducer fan. (Cut sheets and visual inspection.)
- (51) Exhaust fan. (Cut sheets and visual inspection.)
- (52) Water closets and urinals. (Cut sheets and visual inspection.)
- (53) Lavatories. (Cut sheets and visual inspection.)
- (54) Sinks. (Cut sheets and visual inspection.)
- (55) Drinking fountains. (Cut sheets and visual inspection.)
- (56) Pipe and fittings, hot and cold water. (Cut sheets and visual inspection.)
- (57) Sanitary sewer and vent pipes. (Cut sheets and visual inspection.)
- (58) Traps and cleanouts. (Cut sheets and visual inspection.)
- (59) Floor drains, Fed. WW-P-541, Type 216. (Cut sheets and visual inspection.)
- (60) Sleeves and openings. (Visual inspection only.)
- (61) Pipe hangers and supports (UL and Factory Mutual Approval). (Cut sheets and visual inspection.)
- (62) Water hammer arrestors. (Cut sheets and visual inspection.)
- (63) Escutcheons, cast iron. (Cut sheets and visual inspection.)
- (64) Valves - gate valves, wall hydrants (Fed. WW-P-541), hose bibbs (Fed. WW-P-541, Type 207), and drain valves. (Cut sheets and visual inspection.)
- (65) Sheet metal, diffusers and registers. (Cut sheets and visual inspection.)
- (66) Exhaust fan firestats, NEMA-1. (Cut sheets and visual inspection.)
- (67) Electric incinerator vent piping, UL Std. 103. (Cut sheets and visual inspection.)
- (68) Fiberglass pipe insulation. (Cut sheets and visual inspection.)
- (69) Circuit breakers. (Cut sheets and visual inspection.)
- (70) Motor starters. (Cut sheets and visual inspection.)
- (71) Electric panelboards. (Cut sheets and visual inspection.)
- (72) Disconnect switches. (Cut sheets and visual inspection.)
- (73) Metal conduit (metalizing or electro-galvanizing coating, or zinc coating). (Test.)
- (74) Copper wire, Type THW. (Cut sheets and visual inspection.)
- (75) Conductors, Type RHH. (Cut sheets and visual inspection.)
- (76) Pull boxes and wiring troughs, hot dip galvanized. (Cut sheets and visual inspection.)
- (77) Raceways and fittings, hot dip galvanized, brand names. (Cut sheets and visual inspection.)
- (78) Connectors and terminal lugs, brand names. (Cut sheets and visual inspection.)
- (79) Electric wall mounted unit heaters, same as Item 48 above. (Cut sheets and visual inspection.)

- (80) Contactors. (Cut sheets and visual inspection.)
- (81) Thermostats. (Cut sheets and visual inspection.)
- (82) Control switches, Fed. W-S-896(50). (Cut sheets and visual inspection.)
- (83) Outlet receptacles, Fed. W-C-59(D3 and D7). (Cut sheets and visual inspection.)
- (84) Cover plates, stainless steel or galvanized sheet steel, Fed. W-S-896. (Cut sheets and visual inspection.)
- (85) Outlet boxes, galvanized sheet steel. (Cut sheets and visual inspection.)
- (86) Lighting fixtures. (Cut sheets and visual inspection.)
- (87) Hand dryers. (Cut sheets and visual inspection.)
- (88) Well pumps. (Cut sheets, Manufacturer's certification, and visual inspection.)
- (89) Drop pipe, Schedule 40, galvanized steel pipe. (Visual inspection only.)
- (90) Air relief valve. (Cut sheets and visual inspection.)
- (91) Booster pumps. (Cut sheets, Manufacturer's certification, and visual inspection.)
- (92) Pneumatic tank. (Shop drawings, cut sheets, Manufacturer's certification, and visual inspection.)
- (93) Air compressor. (Cut sheets, Manufacturer's certification, and visual inspection.)
- (94) Water storage tank. (Shop drawings, cut sheets, Manufacturer's certification, and visual inspection.)
- (95) Pump controls, all electrical. (Shop drawings, cut sheets, and visual inspection.)
- (96) Well and tank piping, valves, and fittings. (Cut sheets and visual inspection.)
- (97) Underground water distribution pipe, valves, valve boxes, and water meters. (Cut sheets, Manufacturer's certification, and visual inspection.)
- (98) Fiberglass pipe insulation, same as Item 68 above. (Cut sheets and visual inspection.)

(b) Pump House Buildings

Following are the materials usually found in the construction of pump house buildings, together with the acceptance criteria. Refer to the other Paragraphs herein for other materials that may be used, but not listed below.

- (1) Doors and frames, metal, Fed. RR-D-575. (Shop drawings, cut sheets, and visual inspection.)
- (2) Frame anchors (Steel, zinc coated, or rust-inhibitive painted.) (Shop drawings, cut sheets, and visual inspection.)
- (3) Hardware. (Shop drawings, cut sheets, and visual inspection.)
- (4) Paint. (Sample and test.)
- (6) Exhaust fan. (Cut sheets and visual inspection.)

(c) Drilled Well

The following materials will usually be used in the drilled well. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Casings, ASTM A120, Standard Weight, New Black Steel. (Manufacturer's certification.)

(d) Water System Electrical Equipment

The following materials will usually be used in the water system electrical controls. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Safety switches. (Cut sheets and visual inspection.)
- (2) Power panel. (Shop drawings, cut sheets, and visual inspection.)
- (3) Electric unit heater, same as Items (a)(48) and (a)(79) above. (Cut sheets and visual inspection.)
- (4) Exhaust fan. (Cut sheets and visual inspection.)
- (5) Exhaust fan thermostat. (Cut sheets and visual inspection.)
- (6) Control panel. (Shop drawings, cut sheets, and visual inspection.)
- (7) Light fixtures. (Cut sheets and visual inspection.)

(e) Gravity Sewers

Following are the materials usually found in the gravity sewer system, together with the acceptance criteria. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Sewer pipe, vitrified clay, ASTM C700. (Test.)
- (2) Sewer pipe, concrete sewer, ASTM C14, Table II. (Test.)
- (3) Sewer pipe, asbestos-cement, ASTM C428, Class 2400. (Test.)
- (4) Ductile iron pipe, ANSI A21.51, thickness Class 2. (Manufacturer's certification.)
- (5) Fittings. (Test.)
- (6) Rubber gaskets for sewer pipe joints, ASTM C443, for concrete or clay pipe; ANSI A 21.11, for ductile iron pipe. (Test.)

(f) Tool Houses

Following are the materials usually used in the tool house construction, together with the acceptance criteria. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Doors and frames, metal, Fed. RR-D-575, same as Item (b)(1) above. (Shop drawings, cut sheets, and visual inspection.)
- (2) Anchors (steel, zinc coated or rust-inhibitive painted), same as Item (b)(2) above. (Cut sheets and visual inspection.)
- (3) Hardware, same as Item (b)(3) above. (Cut sheets and visual inspection.)

- (4) Paint. (Sample and test.)
- (5) Roofing, same as other buildings. (Manufacturer's certification and visual inspection.)

(g) Water and Sewage System

Following are the materials usually used in the water and sewer system construction, together with the acceptance criteria. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Well seal. (Manufacturer's certification.)
- (2) Package hypochlorinator. (Shop drawings, cut sheets, and visual inspection.)
- (3) Copper tubing. (Cut sheets and visual inspection.)
- (4) Yard hydrant. (Cut sheets and visual inspection.)
- (5) Electric heat tracing. (Cut sheets and visual inspection.)
- (6) Pipe insulation, metal jacket. (Cut sheets and visual inspection.)
- (7) Hammer arrester. (Cut sheets and visual inspection.)
- (8) Comminutor. (Shop drawings and cut sheets.)
- (9) Aerator. (Shop drawings, cut sheets, and Manufacturer's certification.)
- (10) Clarifier. (Shop drawings and cut sheets.)
- (11) Clarifier center well. (Shop drawings and cut sheets.)
- (12) Air lift sludge pump. (Shop drawings and cut sheets.)
- (13) Sewage chlorinator. (Shop drawings and cut sheets.)
- (14) Reaeration system blower. (Shop drawings, cut sheets, and Manufacturer's certification.)
- (15) Stop gates frames. (Shop drawings and cut sheets.)
- (16) Wall sleeves. (Visual inspection only.)
- (17) pH Analyzer system. (Shop drawings and visual inspection.)
- (18) Wall louvers. (Shop drawings or cut sheets, and visual inspection.)
- (19) Well enclosure hatch. (Shop drawings and cut sheets.)

(h) Rest Area Grounds

Following are the materials usually equipping the outside rest area grounds, together with the acceptance criteria. For any other materials that may be used, but not listed below, refer to the other Paragraphs herein.

- (1) Parking lot luminaires. (Cut sheets and Manufacturer's certification.)
- (2) Security luminaires. (Cut sheets and Manufacturer's certification.)
- (3) Picnic tables. (Cut sheets and visual inspection.)
- (4) Grills. (Cut sheets and visual inspection.)

- (5) Trash cans. (Cut sheets and visual inspection.)
- (6) Benches. (Cut sheets and visual inspection.)
- (7) Bulletin boards. (Shop drawings, cut sheets, and visual inspection.)
- (8) Water fountains. (Cut sheets and visual inspection.)
- (9) Signs. (Sample, shop drawings, and cut sheets.)
- (10) Pavers, brick outside. (Sample, cut sheets, and Manufacturer's certification.)

Sec. 207.04 Materials for Signalization and Electrical System Installation

Materials listed below are those commonly used in traffic signalization and other electrical system installation work. In some cases, the materials specification commonly used for the work may also be listed with the material. It should be noted that occasionally other materials specifications may be used; however, the acceptance criteria will be the same as shown herein. Some of the materials listed may be found to be duplicated in other lists appearing in Secs. 207.02 and 207.03. However, if the material is to be used specifically in signalization or other electrical system installation, administered by any Division other than Traffic Engineering Division, then the acceptance of the material will be governed by the criteria outlined below. If the installation involves traffic signalization administered by Traffic Engineering Division, then acceptance criteria will be as noted on the Pre-Approved Traffic Control Device Listing, as outlined in Sec. 207.01(c) herein.

Where materials acceptance is by catalog cut, these are to be forwarded to the Division administering the work, either the Equipment Division or other, as the case may be, for approval prior to use of the material. Manufacturers' certifications, mill analyses, fabrication inspection reports, and Fabricators' certificates of compliance covering materials requirements are to be forwarded to the State Materials Engineer, as outlined in Secs. 207.01 and 207.01(d) above. Where both catalog cuts and certifications are listed below for materials acceptance, catalog cuts may be used in lieu of certifications, provided that all criteria listed in Sec. 207.01(f) are met, and provided that no testing is required. Where testing is specified, see other Sections of the Manual for the specific sampling and testing requirements of the individual material concerned. In this case, the material may not be accepted solely on modified inspection.

Following are some of the materials usually found in signalization and electrical system work, together with the acceptance criteria. (See also Sec. 207.02(17).)

- (1) Anchor bases, cast steel, for mast arm poles, ASTM A27, Grade 65-35, or other. (Manufacturer's certified physical and chemical analyses.)
- (2) Anchor base plates, for mast arm poles, ASTM A36, or other. (Manufacturer's mill analyses, shop inspection, and fabrication inspection report.)
- (3) Anchor bolts, steel, for high mast lighting standards, AASHTO M314 Grade 55-S1, ASTM F1554 Grade 55-S1, or other. (Fabricator's certificate of compliance.)
- (4) Anchor rods, for anchor base poles, AASHTO M314 Grade 36, ASTM F1554 Grade 36, or other. (Manufacturer's mill analyses, shop inspection, and fabrication inspection report.)
- (5) Base flange and shaft, steel, for high mast lighting standards. (Manufacturer's mill analyses, shop inspection, and fabrication inspection report.)
- (6) Bolts, high strength steel, ASTM A325, or other. (Manufacturer's test report and Fabricator's certificate of compliance.)

- (7) Cable clamps. (No testing or certification required.)
- (8) Cable hangers. (No testing or certification required.)
- (9) Cable rings. (No testing or certification required.)
- (10) Clevises. (No testing or certification required.)
- (11) Concrete, miscellaneous hydraulic cement. (See Sec. 207.02, Item 14 above, for criteria for acceptance with reduced testing and inspection.) (If installation work is administered by Equipment Division personnel, they will secure the delivery ticket containing the required Producer's statement of batch data.)
- (12) Conductors, ASTM B3, B8, or other. (Manufacturer's certification and catalog cut.)
- (13) Conduit, metal. (Test. Metal fittings approved on Manufacturer's certified analysis, including zinc content.)
- (14) Connectors and terminals. (Manufacturer's certification and catalog cut.)
- (15) Controllers. (Manufacturer's certification and catalog cut.)
- (16) Controller cabinets. (Manufacturer's certification and catalog cut.)
- (17) Detectors. (Manufacturer's certification and catalog cut.)
- (18) Epoxy resins. (Test, unless material meets provisions and requirements of Sec. 207.02, Item (18) above, in which case accept as noted.)
- (19) Ground clamps, ASTM A220, Any Grade, or other. (Manufacturer's certified physical and chemical analyses.)
- (20) Ground rods. (No testing or certification required.)
- (21) Ground wire, ASTM B2, or other. (Manufacturer's certification and catalog cut.)
- (22) Guy anchors. (No testing or certification required.)
- (23) Guy guards. (No testing or certification required.)
- (24) Insulators. (Manufacturer's certification and catalog cut.)
- (25) Lamps. (Manufacturer's certification and catalog cut.)
- (26) Poles, aluminum, including breakaway, for lighting standards, luminaires, pedestal poles, or other, AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. (Manufacturer to certify that product meets noted specification. Also, if poles are required to meet certain alloy specifications, such as ASTM, then Manufacturer's certified physical and chemical analysis is required. This includes aluminum alloy breakaway support couplings, ASTM B209 or other.)
- (27) Poles, steel, for traffic signals. (Manufacturer's mill analyses, shop inspection, and fabrication inspection report.)
- (28) Poles, steel, including breakaway, for lighting standards, high mast lighting standards, mast arm poles, combination mast arm-luminaire arm poles, and pedestal poles, AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. (Manufacturer to certify that product meets noted specification. Also, if poles are required to meet certain other specifications, such as ASTM, then requirements of Item 2 above must be met.)

- (29) Poles, wood treated, for traffic signals, ANSI 05.1, or other. (Require no testing or certification. Preservative and treatment approved at point of treatment.)
- (30) Relays. (Manufacturer's certification and catalog cut.)
- (31) Splice and switch boxes. (Manufacturer's certification and catalog cut.)
- (32) Steel, reinforcing. (Test.)
- (33) Switches. (Manufacturer's certification and catalog cut.)
- (34) Tape. (No testing or certification required.)
- (35) Thimbleye bolts. (No testing or certification required.)
- (36) Thimble nuts. (No testing or certification required.)
- (37) Traffic signal heads. (Manufacturer's certification and catalog cut.)
- (38) Washers. (No testing or certification required.)
- (39) Wire, span and guy, ASTM A475, or other. (Test.) (See also Sec. 204.36 herein.)

SECTION 208 MATERIALS CERTIFICATION AND DOCUMENTATION PROCEDURES FOR SPECIAL PROJECTS

Sec. 208.01 General

This Guideline covers procedures to be used in sampling, testing, inspecting, reporting, documenting, and certifying materials to be used in the following types of projects:

- (1) Minimum Plan Projects.
- (2) No Plan Projects.
- (3) Federal-Aid Highway Safety Improvement Projects.
 - (a) Railroad-Highway Grade Crossings.
 - (b) High-Hazard Locations.
 - (c) Elimination of Roadside Obstacles.
 - (d) Federal-Aid Safer Road Demonstration Projects.
- (4) Pavement Marking Demonstration Projects.
- (5) Selected Items Constructed by State Forces on Federal-Aid Projects.
- (6) Rest Area Projects.
- (7) Traffic Signal and Other Electrical System Installations.

It will be the intent that a special or modified materials acceptance program be utilized on these miscellaneous projects where possible. Based upon a review of the preliminary project data and the scope of the project in terms of quantities of materials, among other factors, the State Materials Engineer will determine the materials acceptance program to be used.

Materials acceptance will generally follow the same routine as that for normal contract construction projects, with some minor modifications, as outlined below.

Sec. 208.02 Preliminary Documentation

The Materials Division will routinely receive the following data in the initial stages of project development, in order to identify those projects on which to use the special materials acceptance program:

(a) Authorizations for Fund Expenditures

Copies of these will be received from Programming and Scheduling Division.

(b) Program Approvals and Miscellaneous

Copies of Program Approvals from FHWA, copies of letters to Districts requesting sketches, quantities, etc. when applicable, copies of the work sketches and quantities, and copies of Preliminary Engineering Authorizations will be received from Location and Design Division.

(c) Detailed Estimates, Bid Tabulations, and Miscellaneous

Copies of Detailed Estimates (Including those for State Force Work) on Federal-Aid projects just prior to submission to FHWA, Bid Tabulations, and other contract special provisions and documents where applicable will be received from Construction Division.

(d) Forms C-5

Forms C-5, Reporting, Starting and Completion of Projects, will be received from the District or Residency Office.

(e) City-State Agreements

Copies of City-State Agreements where applicable will be received from Urban Division.

(f) Purchase Orders

Copies of Purchase Orders for materials to be used in the above noted projects, including those materials to be stocked at the Central Warehouse, will be received from Administrative Services Division. If the project involves signalization work to be handled by the Equipment Division, and that Division orders signal equipment specifically for use on a project, then a copy of the Purchase Order with the specific project number noted thereon will be received from Equipment Division.

(g) Estimated Quantities of Materials Lists

Copies of Estimated Quantities of Materials Lists will be received from the District Administrator, in accordance with Secs. 106.01(a) and 800 herein, with the exceptions outlined in Sec. 208.03 below. In cases of State Force work, any preliminary work sketches prepared in accordance with Paragraph (b) above would normally contain a materials summary with quantities. If so, the sketches can then serve the same purpose as, and in lieu of, an Estimated Quantities of Materials List.

(h) Sources of Materials Lists

Contractor's or State's Sources of Materials Lists will be received from the District Materials or Resident Engineer, in accordance with Secs. 106.01(b) and 800 herein, with the exception outlined in Sec. 208.03 below. If all sources have not been determined by the Contractor or Resident Engineer, it is suggested that a partial list be submitted as early as possible, and the remainder of the sources be submitted in subsequent lists as they become known. If the sources are known by the Materials Division prior to the purchase of material and in the early stages of

the project, then the Division will be able to provide better service to the field, by providing early pretesting, preinspection, or precertification of materials where required and at the source.

Materials to be obtained on Purchase Order or from the Central Warehouse should be so noted, since inspection of these, where required, normally will be automatic.

If the contract work is to be administered by a municipality, the Materials Division will request the municipality to obtain and submit its Contractor's sources of materials.

Sec. 208.03 Rest Area and Signalization Work

If the Project involves rest areas, the Environmental Quality Division will notify the Materials Division of the details of the work and of the quantities of materials involved. The Materials Division will then request the District Administrator to secure the Sources of Materials List, as outlined in Sec. 208.02(h) above.

If the work involves the installation of traffic signals, sign lighting, roadway lighting, or other electrical systems, administered by Equipment Division, they will notify the Materials Division, supplying details of the work and estimated quantities of materials. If the work is to be by contract, the Materials Division will then request the District Administrator to secure the Sources of Materials List, as outlined in Sec. 208.02(h) above. If the work is to be performed by the Equipment Division, then that Division will advise the Materials Division of the proposed source of materials, whether from Central Warehouse stock or from their own special order.

Sec. 208.04 Determination of Materials Acceptance Program

Upon receipt and review of the data noted in Secs. 208.02 and 208.03 above, the State Materials Engineer will determine whether or not to use a modified materials acceptance program, and will notify the District Materials Engineer of the basis for acceptance of each material listed. This notification will be by return copy of the Sources of Materials List, or by copy of the electrical system installation notice from the Equipment Division, or by other similar means. This will show whether the material is to be inspected by Department personnel or by commercial agencies, and/or whether the material is to be accepted by sampling and laboratory test, visual inspection, Manufacturer's certification, Resident Engineer's certification, or other means.

Sec. 208.05 Acceptance Procedures During Course of Project

During the course of the project, generally the same procedures will be used for materials acceptance as those used for routine contract projects or Purchase Orders, as outlined in Sec. 207 and elsewhere within the Manual, with the exceptions noted herein.

(a) Documenting Materials Acceptance

All materials used, whether from Residency stock, Central Warehouse stock, special order, Contractor's sources, or other sources, must be materials covered by test reports, inspection reports (Forms TL-109), Manufacturers' certifications and/or mill analyses, acceptable catalog cuts, visual inspection procedures, Central Warehouse pre-inspection procedures, Pre-Approved Lists, or other acceptable documentation, as set forth elsewhere in the Manual, subject to the modifications noted herein.

(See Secs. 207 and 109.03 respectively for a list of materials acceptable on modified inspection and for the criteria by which the materials are acceptable in this manner.)

Materials for use in the above projects obtained from Central Warehouse stock for distribution and use by the Residency will be preapproved (tested, inspected, or certified) by the Materials Division where necessary prior to use. Procedures for this inspection are established with the Administrative Services Division, whereby the inspection needs will be handled by the Materials

Division upon receipt of copies of Purchase Orders from Administrative Services Division. Copies of pertinent Purchase Orders and related test and inspection reports for these materials will be kept on file in the Materials Division's General Services Section.

In the case of traffic signalization work to be administered by the Equipment Division, using material drawn from Central Warehouse stock or from their own special order, this material likewise will be preapproved by the Materials Division through procedures established with the Equipment and Administrative Services Divisions. Copies of these Purchase Orders and related test and inspection reports will also be kept on file as noted above.

Similarly, in cases where previously tested material is used from Residency stock (Material obtained from sources other than the Central Warehouse), the Resident Engineer may desire to document his records by correlating Purchase Orders with corresponding test reports where possible and feasible. While this is not mandatory, it is suggested as one of several means at his disposal of verifying receipt and use of tested material prior to approving invoices for payment. It would also be useful in cases where the Resident Engineer must certify Residency stock material, as outlined in Sec. 208.08(b).

(b) Materials Notebook

A materials notebook will be required, except on traffic signalization work installed by the Equipment Division and where otherwise noted herein. If the type of project requires a diary and/or sketch book, these may also be kept in the same notebook in combination with the materials records. The materials notes shall include, among other notes, the materials used and a summary of materials used (in a separate section of the combination book where this method is used). The summary is to show the date used, type of materials, and the source. In cases where As-Built Plans are used, a notebook will still be required for the materials records.

(c) Combination Projects

In the case of combination projects, in which different portions of the project are constructed separately by contract and by State Forces, separate materials notebooks may be kept for each phase of the work, or documentation for both phases may be kept in the same notebook. If the latter method is used, the documentation in the same notebook must be separated to identify clearly the portions of work performed in each phase (Contract and State Forces).

(d) Railroad-Highway Projects

In the case of railroad-highway warning device projects constructed by railroad companies, the materials used are to be only those which conform to Association of American Railroads (AAR) Specifications. In this case, there will be no project materials notebook to be kept by State personnel during construction.

(e) Municipally Administered Urban Projects

In the remote case of a municipally administered urban project, a materials notebook will probably not be available. However, other acceptable means of maintaining and documenting materials records would probably be available from the municipality.

Sec. 208.06 Corrective Actions and Price Adjustments

With the exception of Secs. 208.05(d) and (e) above, application of corrective actions or price adjustments on contract work will be administered the same as for routine projects. This applies especially to aggregate base and subbase materials and asphalt concrete. (For more complete details, see Secs. 202.03, 300, and 500 herein.)

If the defective material has been obtained by Purchase Order, it shall be handled and disposed of, as outlined in Sec. 110.07 herein.

If the defective material occurs on projects governed by statistical specifications, corrections or adjustment will be governed accordingly.

Sec. 208.07 Handling of Materials and Reports

Distribution and handling of material records and reports will be the same as for routine projects, and in accordance with Sec. 800, unless otherwise noted herein. Copies of test reports, inspection reports, and/or Manufacturers' certifications will be distributed routinely. Where required, retention of materials records in the various files will be in accordance with current instructions governing this policy, as published by Administrative Services Division.

Sec. 208.08 Checking Records at Project Completion

All field materials records are to be submitted to the District Office at project completion.

(a) Materials Notebook and Reports

The materials notebook and all pertinent test reports, inspection reports, Manufacturers' certifications, and other related materials documents received in the field will be given to the District Materials Engineer for verification of accuracy and completeness. Although it will not be necessary for the Resident Engineer to submit individual materials reports covering tested material used from Residency stock (usually obtained on Purchase Order), these would be helpful if available. (This material will be covered by the Resident Engineer's Certification in Paragraph (b) below.) Likewise, materials used in traffic signalization work installed by the Equipment Division need not be certified or documented by the Resident Engineer, other than the completion of Form C-5, since these will be covered by the Equipment Division's certification as noted below.

(b) Resident Engineer's and Equipment Division's Certifications

On projects involving the use of State Forces and materials from Residency stock, the Resident Engineer, in addition to completing Form C-5, will also complete and forward to the District Materials Engineer a materials certification. The certification should read as follows:

"All materials used on the above project conformed to the applicable requirements of the Virginia Department of Transportation Specifications. The materials used are covered by test reports, mill reports, Manufacturers' certifications, or other acceptable documentation. Any exceptions to this are shown in attached documents with reasons therefor."

For materials used that come from other than tested Residency or Central Warehouse stock, it will be necessary to provide documentation with the certification in the form of test reports or other previously noted acceptable means as required.

The certification of traffic signalization work installed by the Equipment Division will be handled by that Division. Upon completion of the work, the Equipment Division will provide the Materials Division with a copy of the final statement distributed to the Residency. This statement will include the State and Federal project numbers, a list of materials used, and a certification statement to the effect that all materials used were those taken from approved Central Warehouse stock, approved special order material, or were those approved by visual inspection at the job site, and meeting the requirements of the Virginia Department of Transportation. This final document should also be forwarded by the Resident Engineer to the District Materials Engineer. (See Secs. 207 and 208.09 for materials acceptance requirements.)

(c) Railroad Company Projects

On projects constructed by railroad companies, the company will prepare a certification at project completion, certifying that all materials used in the project conformed to AAR Specifications. The company will submit the certification, which either may be typed on the final bill or attached as a separate document to the Right-of-Way Division. After a review, the Right-of-Way Division will forward the documents to the District and Resident Engineers, who, after review and approval, will forward the certification to the District Materials Engineer.

(d) Verification of Records in District

After verification of records, the District Materials Engineer will send to the State Materials Engineer (1) a copy of the materials section of the notebook where applicable, (2) necessary copies of any pertinent test reports and certifications, and (3) the Resident Engineer's, the Equipment Division's, or the railroad company's certification where applicable. All copies of documents must be legible.

(e) Certification to FHWA

The District Administrator will use the above noted documents for purposes of materials certification to the FHWA where applicable, or for file documentation in the case of a State Financed Project. Final certification to FHWA will be made on Form TL-131, as outlined in Sec. 800.

Sec. 208.09 Special Materials Acceptance Guidelines

The special materials acceptance program, where designated by the State Materials Engineer, shall encompass generally the following guidelines. Unless otherwise specified herein, the instructions as set forth elsewhere in the Manual will govern the requirements for materials acceptance. Particular attention is called to Sec. 207. This provides for other relaxations in materials requirements in certain situations. It should be noted that, while modified sampling and testing may be authorized, the District Materials Engineer must maintain a materials testing program consistent with the needs of the project.

SECTION 209 CHAPTER II - APPENDIX A

Included herein are lists of prequalified materials covered by standard specifications. Some are accepted based on the approved list, others require certification or testing, but must be on the prequalified list. To view the approved lists, access the following web address:

www.VirginiaDOT.org/business/materials-download-docs.asp

Concrete Pipe Plant Monitor Report

Date _____

Manufacturer _____

Producers Technician _____

Location _____

District _____

This form is to assist those in the review process. A number of questions are provided for this purpose. The applicable specifications contain greater detail than this check list, which is required to assure that all is in compliance. Use both in this monitoring effort.

A. Does the Qualified Technician (QT) have the following equipment?

1. Calipers Yes _____ No _____

2. Steel Tape Yes _____ No _____

3. Feeler Gauge 0.01" (0.03 mm) Yes _____ No _____

4. Micrometer Yes _____ No _____

5. Industry Stamp Yes _____ No _____

Remarks _____

Do the materials used in the production of concrete pipe meet the applicable specifications? Cement, Aggregates, Reinforcement, Fly Ash, etc.

Yes _____ No _____

Remarks _____

Has the producer complied with Section 105 for pipe sizes that do not have values listed in the design tables for diameter, wall thickness, compressive strength and reinforcement?

Yes _____ No _____

Remarks _____

Do shipping tickets/documents contain a statement certifying that the pipe shipped has been tested, inspected and approved under an approved producer QC acceptance program?

Yes _____ No _____

Remarks _____

B. PHYSICAL REQUIREMENTS

External Load Crushing Strength Test by the Three-Edge Bearing Method

1. Is the testing apparatus in accordance with AASHTO T280?
 Yes _____ No _____
 Remarks _____
2. Is crack and ultimate load tested properly?
 Yes _____ No _____
 Remarks _____
3. If any pipe failed, were the appropriate retests performed?
 Yes _____ No _____
 Remarks _____
4. Is the following information clearly marked on each section of pipe?
 - a. The pipe class and specification designation
 Yes _____ No _____
 - b. The date of manufacture
 Yes _____ No _____
 - c.. The name or trademark of the manufacturer and identification of plant
 Yes _____ No _____
 Remarks _____
5. Are results of all tests recorded by the producer's technician?
 Yes _____ No _____
 The records should include a minimum of the following:
 Producers name _____
 Specifications that pipe is to meet _____
 Diameter of Pipe _____
 Class and D-load of Pipe _____
 Production Dates and Quantity of Pipe per date _____
 Length of Pipe _____
 Wall thickness of Pipe _____
 Total size, quantity of lot _____
 Number of tests to be run _____
 Results of tests including:
 Date of pipe being tested _____
 Gauge reading in pounds (newtons) when .01 (0.03 mm) crack developed _____
 Required minimum gauge reading in pounds for .01 (0.03 mm) crack _____
 Required D-load reading at .01 (0.03 mm) _____
 Gauge reading in pounds (newtons) for ultimate load _____
 Required minimum gauge reading in pounds (newtons) for ultimate load _____
 Size of wire reinforcing in pipe _____
 Required minimum required area of wire reinforcing for pipe _____

If the initial test or tests fail, retests should be recorded as above but shall be indicated specifically as retest.

Final Quantity of pipe approved _____

Production dates of pipe and quantity per date of approved pipe _____

Production dates of pipe and quantity per date of not approved pipe _____

Remarks _____

C. ABSORPTION TEST

1. Is the laboratory adequately equipped to perform the test?

Yes _____ No _____

Remarks _____

2. Do test specimens meet the minimum dimensional requirements?

Yes _____ No _____

Remarks _____

3. Are absorption tests performed in accordance with the requirements?

Yes _____ No _____

Remarks _____

4. Do the absorption test results meet the specified requirements?

Yes _____ No _____

Remarks _____

5. If a test specimen failed, was the appropriate retest performed?

Yes _____ No _____

Remarks _____

D. COMPRESSIVE STRENGTH CYLINDERS

1. Is the laboratory adequately equipped to perform the test?

Yes _____ No _____

Remarks _____

2. Are concrete cylinders prepared in accordance with AASHTO T-23 and AASHTO M242?
 Yes _____ No _____
 Remarks _____
3. Are cylinders cured in like manner as the pipe?
 Yes _____ No _____
 Remarks _____
4. Are cylinders capped in accordance with AASHTO T-231?
 Yes _____ No _____
 Remarks _____
5. Are cylinders tested in accordance with AASHTO T-22?
 Yes _____ No _____
 Remarks _____
6. Are the results of the compression tests equal to or greater than the required strength?
 Yes _____ No _____
 Remarks _____
7. If a test specimen failed, was the appropriate retest performed?
 Yes _____ No _____
 Remarks _____
8. Date testing machine was calibrated _____
 Remarks _____
9. Are results of all tests recorded by the producer's technician?
 Yes _____ No _____
 Remarks _____

The records should include a minimum of the following:

Producers name _____
 Specification that pipe is to meet _____
 Diameter of Pipe _____
 Class of Pipe _____
 Production Dates and Quantity of Pipe per date _____
 Length of Pipe _____
 Wall thickness of Pipe _____
 Total size, quantity of lot _____
 Number of tests to be run _____

Results of test including: _____

Date of pipe being tested that cylinders represent _____

Date concrete cylinders were cast _____

Compression test machine load _____

Compressive strength of cylinder in Psi/MPa _____

Minimum required compressive strength of cylinder is PSI/MPa _____

If initial test or tests fail, retests should be recorded as above, but shall be indicated specifically as retest.

Final Quantity of pipe approved _____

Production dates of pipe and quantity per date of approved pipe _____

Production dates of pipe and quantity per date of not approved pipe _____

E. COMPRESSIVE STRENGTH - CORES

1. Is the laboratory adequately equipped to perform the test?

Yes _____ No _____

Remarks _____

2. Are cores cut and tested in accordance with AASHTO T-280?

Yes _____ No _____

Remarks _____

3. Are cores capped in accordance with AASHTO T-231?

Yes _____ No _____

Remarks _____

4. Is the compressive strength equal to or greater than the required strength?

Yes _____ No _____

Remarks _____

5. If a test specimen failed, was the appropriate retest performed?

Yes _____ No _____

Remarks _____

6. Date testing machine was calibrated _____

Remarks _____

7. Are results of all tests recorded by the producer's technician?

Yes _____ No _____

Remarks _____

The records should include a minimum of the following:

Producers name _____

Specification that pipe is to meet _____

Diameter of Pipe _____

Class of Pipe _____

Production Dates and Quantity of Pipe per date _____

Length of Pipe _____

Wall thickness of Pipe _____

Total size, quantity of lot _____

Number of tests to be run _____

Results of test including:

Date of pipe being cored and tested _____

Size of wire reinforcing in pipe _____

Required minimum area of wire reinforcing for pipe _____

Diameter of core _____

Length of Core _____

Ratio L/D _____ Strength Correction Factor _____

Area of Core _____

Compression test machine load _____

Compressive strength of core in PSI/MPa _____

Corrected compressive strength of core in PSI/MPa _____

Minimum required compressive strength of core in PSI/MPa _____

If the initial test or tests fail, retests should be recorded as above but shall be indicated specifically as retests.

Final Quantity of pipe approved _____

Production dates of pipe and quantity per date of approved pipe _____

Production dates of pipe and quantity per date of not approved pipe _____

Remarks _____

F. MANUFACTURE

1. Does gage of wire, spacing and minimum cover conform to specification?

Yes _____ No _____

Remarks _____

2. Are dimensions, laps and welds of wire cages within tolerance?

Yes _____ No _____

Remarks _____

3. Are curing facilities adequate?

Yes _____ No _____

Remarks _____

4. Dimensions of Pipe; Do the following components comply with specification requirements?

a. Wall thickness?

Yes _____ No _____

b. Variation in laying length?

Yes _____ No _____

c. Underrun in length?-

Yes _____ No _____

d. Internal diameter?-

Yes _____ No _____

e. Bell and spigot?

Yes _____ No _____

5. Is reinforcing wire/steel exposed?

Yes _____ No _____

Remarks _____

6. Is the position of the reinforcing wire/steel in the pipe within specification?

Yes _____ No _____

Remarks _____

7. Is the spacing center to center of circumferential reinforcement within specification?

Yes _____ No _____

Remarks _____

8. Is the pipe substantially free of fractures, cracks and surface roughness?

Yes _____ No _____

Remarks _____

G. REPAIRS

If repairs were necessary, are the repairs sound and properly finished and cured?

Yes _____ No _____

Remarks _____

List the VDOT Technician Monitor samples taken during this review.

<u>SAMPLE NUMBER</u>	<u>TYPE OF MATERIAL</u>	<u>TO BE TESTED FOR</u>	<u>RESULTS</u>
--------------------------	-----------------------------	-------------------------	----------------

Signature of Person Conducting Monitor Review

Title

Corrugated Metal Pipe Plant Monitor Report

Date: _____

Plant Name: _____

Location: _____

Pipe Inspected _____

Diameter: _____

Length: _____

Lot Number: _____

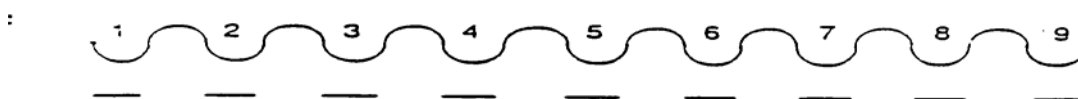
Heat Number: _____

PHYSICAL MEASUREMENTS

Specified Sheet Thickness _____ Measurement _____

Average Zinc Thickness _____ oz./ft.²(g/m²)

Corrugation Depth: _____



Asphalt Thickness: _____

Asphalt Pavement Width: _____

Asphalt Pavement Depth: _____

Vat Temperature: _____

Date of Asphalt Analysis: _____

Length: _____

Diameter: _____

Arch Radius: _____

"B" Measurement: _____

LOCKSEAM**STRENGTH****TEST**

Specified Thickness _____ Actual _____ lbs.(N) Min.Req'd. _____ lbs.(N)

Specified Thickness _____ Actual _____ lbs.(N) Min.Req'd. _____ lbs.(N)

Specified Thickness _____ Actual _____ lbs.(N) Min.Req'd. _____ lbs.(N)

Specified Thickness _____ Actual _____ lbs.(N) Min.Req'd. _____ lbs.(N)

Dents or Bends: _____

End Finish: _____

Coating Repairs: _____

(Zinc/Asphalt)

Plant

Records

Mill Analysis: Yes _____ No _____

Inspection Records: Yes _____ No _____

Are records retained for 2 years? Yes _____ No _____

Reinforcing Steel Fabrication Shop

INSPECTION CHECK LIST

This form shall be used by the VDOT inspector when performing inspection of the reinforcing steel fabricators storage, handling, and fabrication activities. The inspections are to be performed on steel fabricators performing work for Virginia Department of Transportation approximately every 4 - 6 weeks.

Fabricator:_____

Date:_____Inspector:_____

1. Check mill analyses for the black reinforcing steel and certifications for the epoxy coating used and the application of the epoxy coating.

Mill Analysis Meet Specifications? _____Yes _____No.

Comments_____

2. Are padded bundling bars or nylon straps being used during handling of the coated bars?
_____Yes _____No.

Comments_____

3. Are suitable bands being used to prevent damage to the epoxy coating? Bare wire shall not be used. _____Yes _____No.

Comments_____

4. Are bundled bars moved in such a way as to prevent bar-to-bar abrasion due to sagging? Bundle tie wires shall not be used to pick up bundles. _____Yes _____No.

Comments_____

5. Are drive rolls on shear beds and back-up barrels on benders protected with a suitable cover to minimize damage during fabrication?

_____Yes _____No.

Comments_____

6. Are bars stored above the ground on wooden or padded supports? If coated bars are stored outside, are they protected from sunlight?

_____Yes _____No.

Comments_____

7. Is bar identification maintained throughout the fabrication process?

____ Yes ____ No.

Comments _____

8. Is the coating being repaired in the shop? ____ Yes ____ No.

Comments _____

9. How are the bars being cut? (They should not be burned unless fully repaired _____)

Comments _____

10. Are epoxy coated bars being repaired within 8 hours after the bars are cut? If not the bars shall be cleaned and repaired according to AASHTO M284. ____ Yes ____ No.

Comments _____

11. Check certification documents for compatibility of repair material with the epoxy coating. Is the repair material compatible? ____ Yes ____ No.

Comments _____

Reinforcing Steel Epoxy Coating Plant Review

Plant:_____Date:_____

VDOT Q.A. Inspector (Signature)_____

I. BARS

A. Check for contaminants on bars prior to cleaning and coating

1. Contaminants Observed?

_____Yes_____No

2. If Yes, on what number of bars?_____

Approximate surface area:_____Less than 6" (150 mm)
in 6 ft. (1.8 m)

_____More than 6" (150 mm)
in 6 ft. (1.8 m)

3. Corrective Action:_____

B. Check for Surface Defects on Uncoated Bars

1. Surface Defects Noted? _____Yes_____No

2. Type of Defects:_____

3. Corrective Action:_____

II. BLAST CLEANING

All tests to be performed by plant quality control personnel, and observed by VDOT quality assurance inspector.

A. Comparison to Visual Standards

1. Bar Size: #_____

2. Meets SSPC Vis. 1 degree of cleaning SSPC-SP10?

- a. Sample 1: _____ Yes _____ No Comments _____
- b. Sample 2: _____ Yes _____ No Comments _____
- c. Sample 3: _____ Yes _____ No Comments _____

B. Copper Sulfate Test

- 1. Bar Size: # _____
- 2. Percent of Surface Area Unreacted (i.e., not copper-colored)
 - a. Location 1: _____ % Location 2: _____ %

C. Chloride Test - Blasted Bar Surface

- 1. Bar Size: # _____
- 2. Chlorides Present (refer to Visual Standard)
 - a. Location 1: _____ ppm
 - Location 2: _____ ppm
 - Location 3: _____ ppm

D. Backside Contamination

- 1. Bar Size # _____
- 2. Percent Contamination
 - a. Location 1: _____ % Location 2: _____ % Location 3: _____ %

E. Anchor Profile

- 1. Required _____
- 2. Bar Size: # _____
- 3. Location A: Depth _____ mils (μm)
- Location B: Depth _____ mils (μm)
- Location C: Depth _____ mils (μm)

Average Depth _____ mils(μm)

III. CLEANING ABRASIVE

A. Check Operation of Blasting Equipment

1. Equipment Functional: _____ Yes ___ No
2. Comments: _____

B. Check Abrasive Mix for Oil Contamination

1. Time Mix Sampled: _____
2. Oil in Mix: _____ Yes _____ No
3. If Yes, Action Taken: _____

C. Chloride Test - Abrasive (Required once per Week)

1. Chlorides Present: _____ ppm

D. Sieve Analysis (Required once per Week)

1. Review Plant Records

IV. HEATING

A. Check Bar Temperature Prior to Coating

1. Recommended by Epoxy Manufacturer _____
2. Bar Size: # _____
3. Temperature Recorded (1 temperature per bar in the set, i.e., 4-bar line - 4 temperatures should be recorded.)

_____ °F(°C) _____ °F(°C) _____ °F(°C) _____ °F(°C)
 _____ °F(°C)

V. POWDER APPLICATION

A. Check for Oxide Formation on Cleaned Bars

B. Check Electro-Static System Operation

1. System Functional: _____ Yes _____ No

C. Check Powder Air Supply

1. Air System Functional: _____ Yes _____ No

D. Inspect Bar Transport System

1. Damage to Coating: _____ Yes _____ No

2. If Yes, Action Taken: _____

E. Check Line Speed

1. Time from Application Booth to Quench: _____ seconds

2. Manufacturer's Recommended Quench Time _____ seconds

3. Bar Size: #_____

VI. ACCEPTANCE TESTING

A. Check Operation of In-Line Holiday Detectors

1. Time: _____

2. Detectors Operational: _____ Yes _____ No

3. If No, Action Taken: _____

B. Check with Hand-Held Holiday Detector

_____ No. of Holidays Bar Length: _____ feet (meters)

C. Calibrate Thickness Gage

1. Correction for Anchor Profile: _____ mils (μm)

D. Perform Thickness Measurements for One Bar Once Per Shift and Change of Bar Size

Thickness Measurements (Mils) (μm)

	1	2	3	4	5	6	7	8	9	10
Reading #1	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Reading #2	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Reading #3	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Average of 3 Readings	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

E. Perform Bend Test Per Purchaser's Specification

Bar	Degree	Pin	Test	Bar Temp	Bend
<u>Size</u>	<u>of Bend</u>	<u>Diameter</u>	<u>Results</u>	<u>$\leq 86^{\circ}\text{F}$</u> <u>$(\leq 30^{\circ}\text{C})$</u>	<u>Rate</u>
_____	_____	_____	_____	_____ $^{\circ}\text{F}$ ($^{\circ}\text{C}$)	_____ Sec.

VII. HANDLING AND STORAGE (PLANT WALKTHROUGH)

A. Inspect Powder Storage

1. Manufacturer's Recommendation _____ $^{\circ}\text{F}$ ($^{\circ}\text{C}$)
2. OK? _____ Yes _____ No

B. Check Temperature of Powder Storage Area

1. Temperature: _____ $^{\circ}\text{F}$ ($^{\circ}\text{C}$)

C. Check Shelf Life of Powder

1. Manufacturer's Recommendation _____
2. Powder Manufacturer's Lot #'s in Use During Shift: _____

D. Inspect Coated Bars Prior to Shipment

1. Damaged: _____ Yes _____ No
2. If Yes, Action Taken: _____
3. Are damaged areas repaired with compatible material?
_____ Yes _____ No Brand _____

E. Inspect Stockpiles of Coated Bars (if applicable)

1. Bars Properly Bundled? _____ Yes _____ No
2. Bars Properly Stored? _____ Yes _____ No
3. Rejected Bars Identified and Segregated? _____ Yes _____ No

VIII. General Comments

Precast Concrete Plant Monitor Report

DATE_____

MANUFACTURER_____

PRODUCERS TECHNICIAN_____

LOCATION_____

DISTRICT_____

This form is to assist those in the review process. A number of questions are provided for this purpose. The applicable specifications contain greater detail than this check list, and are required to assure that all is in compliance. Use both in this monitoring effort.

A. Does the Qualified Technician (QT) have the following equipment?

- | | | | |
|----|---------------------------------|-----------|----------|
| 1. | Calipers | Yes _____ | No _____ |
| 2. | Steel Tape | Yes _____ | No _____ |
| 3. | Feeler Gauge 0.01”
(0.03 mm) | Yes _____ | No _____ |
| 4. | Micrometer | Yes _____ | No _____ |
| 5. | Industry Stamp | Yes _____ | No _____ |
| 6. | Pressure Air Meter | Yes _____ | No _____ |

Remarks:_____

B. Does the producer maintain a Department approved Quality Control Form for all products produced for VDOT projects. Yes ___ No ___**C. PHYSICAL REQUIREMENTS****1. COMPRESSIVE STRENGTH CYLINDERS**

The results should include a minimum of the following for each lot.

Results of test including:

Date of product being tested that cylinders represent_____

Date cylinders were cast_____

Date cylinders were tested _____

Compression test machine load _____

Compressive strength of cylinder in PSI/MPa _____

Minimum required compressive strength of cylinder in PSI/MPa _____

If initial test or tests fail, are retests recorded as above, and indicated specifically as retests.

Yes____ No____ Remarks: _____

- (1) Is the laboratory adequately equipped to perform the test? Yes____ No____

Remarks _____

- (2) Are concrete cylinders prepared in accordance with AASHTO T-23?

Yes____ No____

Remarks _____

- (3) Are Cylinders cured in like manner as the product? Yes____ No____

Remarks _____

- (4) Are Cylinders capped in accordance with AASHTO T231/T22?

Yes____ No____

Remarks _____

- (5) Are Cylinders tested in accordance with AASHTO T22? Yes____ No____

Remarks _____

- (6) Are the results of the compression tests equal to or greater than the required strength?

Yes____ No____

Remarks _____

- (7) If a test specimen fails, was the appropriate retest performed?

Yes____ No____

Remarks _____

- (8) Date testing machine was calibrated? _____

Remarks _____

(9) Are results of the tests recorded by the producers technician? Yes____ No____

Remarks_____

2. AIR - CONCRETE

(1) Is the testing of air content observed? Yes____ No____

Remarks_____

(2) Is the testing performed properly? Yes____ No____

Remarks_____

(3) Is an air entraining agent used in dry cast concrete? Yes____ No____

Remarks_____

3. COMPRESSIVE STRENGTH CORES

The results should include a minimum of the following for each lot.

Results of test including:

Date of product being tested that cores represent_____

Date core was tested_____

Diameter of core_____

Length of core_____

Ratio L/D_____ Strength Correction Factor_____

Area of core_____

Compression test machine load_____

Compressive strength of core in PSI/MPa_____

Corrected compressive strength of core in PSI/MPa_____

Minimum required compressive strength of core in PSI/MPa_____

If initial test or tests fail, are retests recorded as above, and indicated specifically as retests. Yes____ No____

Remarks: _____

(1) Is the laboratory adequately equipped to perform the test? Yes ____ No ____

Remarks _____

(2) Are cores cut and tested in accordance with AASHTO T-24?

Yes ____ No ____

Remarks _____

(3) Are Cores capped in accordance with AASHTO T231? Yes ____ No ____

Remarks _____

(4) Are the results of the compression tests equal to or greater than the required strength? Yes ____ No ____

Remarks _____

(5) If a test specimen fails, was the appropriate retest performed?

Yes ____ No ____

Remarks _____

(6) Date testing machine was calibrated? _____

Remarks _____

(7) Are results of the tests recorded by the producers technician?

Yes ____ No ____

Remarks _____

4. ABSORPTION TEST

(1) Is the laboratory adequately equipped to perform the test?

Yes ____ No ____

Remarks _____

(2) Do test specimens meet the minimum dimensional requirements? Yes ____ No ____

Remarks _____

(3) Are absorption tests performed in accordance with the requirements? Yes____ No____

Remarks _____

(4) Do the absorption test results meet the specified requirements? Yes____ No____

Remarks _____

(5) If a test specimen fails, was the appropriate retest performed? Yes____ No____

Remarks _____

D. MANUFACTURE

(1) Do the materials used in the production of the product meet the applicable specifications? Cement, Aggregates, Reinforcement, etc. Yes____ No____

Remarks _____

(2) Does size of wire/steel, spacing and minimum cover conform to specifications or approved drawings? Yes____ No____

Remarks _____

(3) Are dimensions, laps and welds of wire/steel within tolerance? Yes____ No____

Remarks _____

(4) Are curing facilities adequate? Yes____ No____

Remarks _____

(5) Is reinforcing wire/steel exposed? Yes____ No____

Remarks _____

(6) Is the position of the reinforcing wire/steel in the product within specifications? Yes____ No____

Remarks _____

(7) Is the spacing center to center of circumferential reinforcement within specifications? Yes____ No____

Remarks _____

(8) Is the product substantially free of fractures, cracks and surface roughness? Yes____ No____

Remarks _____

(9) Does the product meet dimensional requirements? Yes____ No____

Remarks _____

(10) Is the following information clearly marked on each section of product?

A. The specification designation? Yes____ No____

B. The date of manufacture? Yes____ No____

C. The name or trademark of the manufacturer and identification of plant? Yes____ No____

D. Are the letters Q.C. affixed to each piece of product as evidence that the required Q.C. procedures have been performed? Yes____ No____

Remarks _____

(11) Do shipping tickets/documents contain a statement that the product shipped has been tested, inspected and approved under an approved producer QC acceptance program? Yes____ No____

Remarks _____

E. REPAIRS

(1) If repairs were necessary, are the repairs sound and properly finished and cured? Yes____ No____

Remarks _____

(2) Is the repair material in accordance with Section 218 of the Road and Bridge Specification? Yes____ No____

Remarks _____

F. MONITOR SAMPLES

List the VDOT Technician Monitor samples taken during this review.

Sample Number	Type of Material	To Be Tested For	Results

OVERALL REMARKS: _____

SIGNATURE OF PERSON CONDUCTING
MONITOR REVIEW

TITLE

Pavement Marking Materials Inventory Ledger

Contractor: Address:					Type of Material:			Manufacturer:	
Quantity	Unit	Date Rec'd.	Date Ship.	Ticket No.	Batch/ Lot No.	MS No.	Bal.	Shipped to: (Proj. No.)	Contr. Q.C. (Init.)

I certify that the above listed types and quantities of materials were received and shipped on the dates shown and come from tested and approved stock.

Contractor Q.C. Technician:_____

Copy to: _____

VDOT Plant

(Signature) Inspector

Rock's Pavement Marking Company 1 Rocky Road Rockville, VA 12345		Ticket No: 1234567890	Lab Test No:
Date: August 17, 1993			
Ship to: 0064-005-123,C501			
Quantity	Unit	Description	
6	Lbs (kg)	Yellow Thermoplastic	MS11111
7	Lbs (kg)	White Thermoplastic	MS22222
3	Lbs (kg)	Glass Beads	MS33333
50	Gals. (L)	Yellow Traffic Paint	MS44444
100	Feet (m)	White Foil Backed Tape	MS55555
5	Ea.	Recessed Pavement Markers	MS66666
<p>Material shipped under this certification has been tested and approved by VDOT as indicated by laboratory test numbers listed hereon.</p> <p>Contractor Q.C. Technician: <u>Rocky Raccoon</u> (Signature)</p>			

Polyethylene Pipe Plant Monitor Report

DATE _____

MONITOR PERIOD _____

MANUFACTURER _____

LOCATION DISTRICT _____

This form is designated to assist those in the review process. A number of questions are provided for this purpose. The applicable specifications contain greater detail than this checklist, and are required to assure that all is in compliance. Use both in this monitoring effort.

- A. Does the producer have the VDOT Approved QA/QC plan available and is the plan current?

Yes _____ No _____

Remarks _____

- B. Does the producer maintain a Department approved Quality Control Form for all products produced for VDOT projects? Yes _____ No _____

Remarks _____

- C. Is there written documentation that the following tests are being performed in accordance with AASHTO M252 and M294?

1. Workmanship Yes _____ No _____

Remarks _____

2. Tubing Dimensions Yes _____ No _____

Remarks _____

3. Perforation Dimensions Yes _____ No _____

Remarks _____

4. Pipe Stiffness Yes _____ No _____

Remarks _____

5. Pipe Flattening Yes _____ No _____
Remarks _____

6. Elongation Yes _____ No _____
Remarks _____

7. Environmental Stress Cracking Yes _____ No _____
Remarks _____

8. Brittleness Yes _____ No _____
Remarks _____

9. Low Temperature Flexibility Yes _____ No _____
Remarks _____

D. MARKINGS

1. Is the following information clearly marked on each 10 foot (3 m) section of the product?

A. The name or trademark of the manufacturer? Yes _____ No _____

B. Nominal size of the product? Yes _____ No _____

C. The specification designation? Yes _____ No _____

D. Plant designation code? Yes _____ No _____

E. The date of manufacture or an appropriate code? Yes _____ No _____

Remarks _____

2. Do shipping tickets/documents contain a statement that the product shipped has been tested, inspected and approved under an approved VDOT PE Pipe QA Acceptance Program? Yes _____ No _____

Remarks _____

E. MONITOR SAMPLES

List the VDOT technician Monitor Samples taken during this review.

<u>Sample No.</u>	<u>Type of Material</u>	<u>To Be Tested For</u>	<u>Results</u>

Overall Remarks:

SIGNATURE OF PERSON CONDUCTING
MONITOR REVIEW

TITLE

March 2002